ORDER NO. HAD8610737C0
A6

Service Manual

Compact Disc Player

SL-P720

SL-P720

COMPACT disc DIGITAL AUDIO

DIGITAL

Compact Disc Player

Color	Areas
(K)	[M] .....U.S.A.
(K)	[MC]...Canada.
(K) (S)	[E] .....Switzerland and Scandinavia.
(K) (S)	[EK]....United Kingdom.
(K) (S)	[XL]....Australia.
(K) (S)	[EG] ...F.R. Germany.
(K) (S)	[EB]....Belgium.
(K) (S)	[EH] ...Holland.
(K) (S)	[EF]....France.
(K) (S)	[Ei] .....Italy.
(K) (S)	[XA]....Asia, Latin America, Middle Near East, Africa and Oceania.
(K) (S)	[XB]....Saudi Arabia.
(K) (S)	[PA]....East PX.
(K) (S)	[PE]....European Miliary.
(K) (S)	[PC]....European Audio Club.

Color

(K)...Black Type
(S)...Silver Type

SPECIFICATIONS

[*Measured by EIAJ(CP-307)]

■ Audio

No. of channels	2(left and right stereo)
Frequency response	4—20,000 Hz ±0.2 dB*
Dynamic range	96 dB*
S/N ratio	102 dB*
Harmonic distortion	0.0012% (1 kHz, 0 dB)*
Total harmonic distortion	0.0025% (1 kHz, 0 dB)*
Channel separation	105 dB
Wow and flutter	Below measurable limit*
Low-pass filter	High resolution digital filter
Output voltage	2.0 V (at 0 dB)*
Output impedance	Approx. 600Ω
Load impedance	More than 10 kΩ

■ Signal Format

Sampling frequency	44.1 kHz
Correction system	Technics Super Decoding Algorithm
D-A conversion	16-bit linear

■ Pickup

Type	Fine-focus, one beam
Access time	1 second* (access to the last track)
Light source	Semiconductor laser
Wavelength	780 nm
Traverse system	High-speed linear access system
Spindle system	Brushless DD motor

■ Headphones

Output level	80 mW max. (variable)
Impedance	32 Ω
Plug	¼ inch stereo

■ Infrared remote control unit

Dimensions (W×D×H)	65×155×18 mm (2-9/16"×6-3/32"×1-25/32")
Batteries	UM-3 "AA" batteries or IEC R6 or equivalent (1.5 V×2)
Weight	140 g (including batteries)

■ General

Power supply:	For U.S.A. and Canada: AC 120 V, 60 Hz For United Kingdom and Australia: AC 240 V, 50 Hz For Continental Europe: AC 220 V, 50 Hz For Others: AC110~127/220~240 V, 50/60 Hz
Power consumption	17 W
Dimensions (W×D×H)	430×260×97.5 mm (16-15/16"×10-1/4"×3-27/32")
Weight	5.2 kg (11.5 lbs.)

Technics

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Secaucus, New Jersey 07094

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Matsushita Electric Trading Co., Ltd.
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
Tokyo 105, Japan

■ Functions

Automatic play	•All tracks
Random access play	•Random access to any track or index
Program play	•Max. of 20 program selections
Skip play	•Forward and backward track skip •Forward and backward program track skip
Search play	•Forward and backward manual search •Button search (2-speed) •Dial search (2-speed)
Display functions	•Music Matrix (20 tracks) •Track number display •Index number display •Time display (min./sec.) •Overflow mark (≫) •Repeat indicator •A-B repeat indicator •Search speed indicator •Output level indicator •Auto space indicator •Music scan indicator •Auto pause indicator •Time mode indicator

When using remote control unit:
•dB display
•Output level indicator
•Programmed order (No.)
(when recall button is pressed)

■ Infrared remote control unit

Remote control function	Basic buttons: 7 Program buttons: 12 Time mode select buttons: 1 Index button: 1 Recall button: 1 Music scan button: 1 Repeat button: 1 A-B repeat button: 1 Digital volume attenuation buttons: 2

Specifications are subject to change without notice for further improvement.
Weight and dimensions are approximate.

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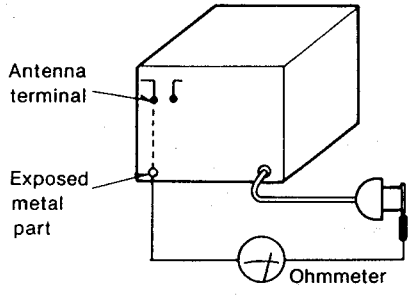
■ SAFETY PRECAUTION (This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

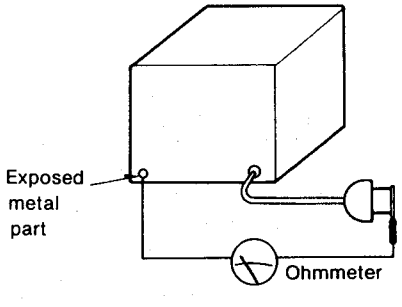
• INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)
Resistance = 3MΩ—5.2MΩ

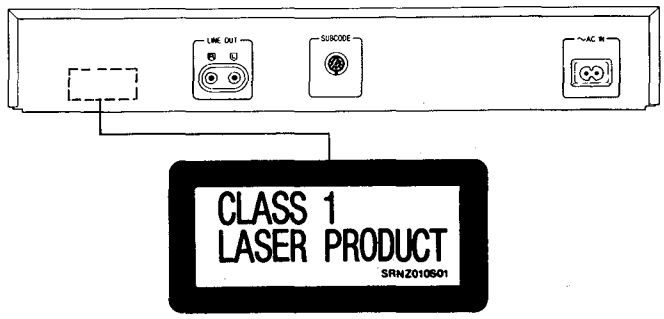


(Fig. B)
Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ PRECAUTION OF LASER DIODE

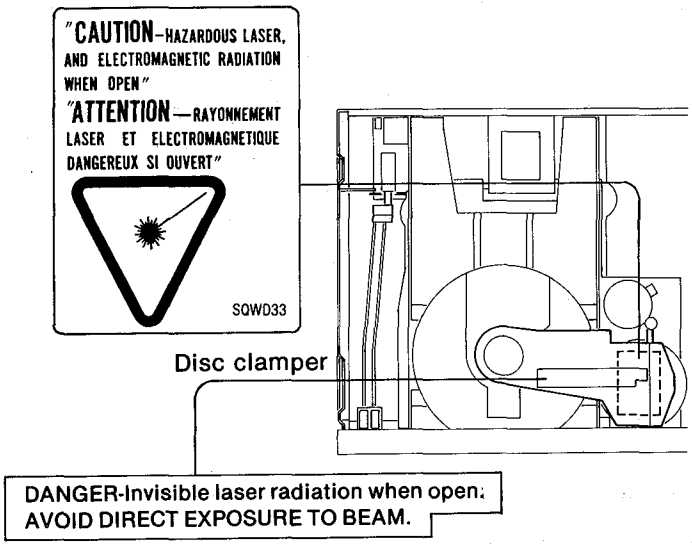
Caution: This product utilizes a laser diode.
ADVARSEL: I dette a apparat anvendes laser.

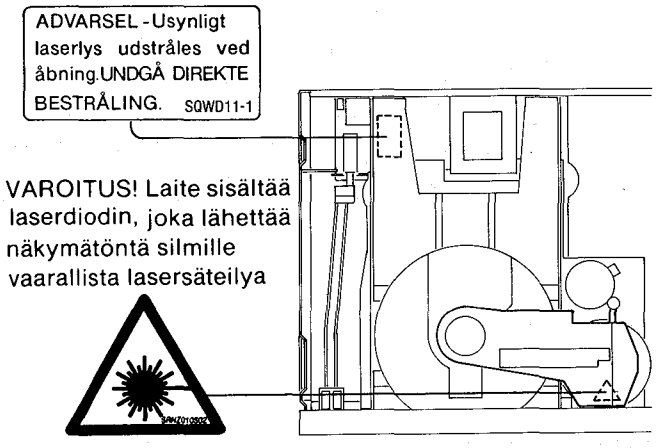


Obs:
Apparaten innehåller laser
Komponent av höger laserklass
än klass 1.

- **Use of caution labels** Note: ○ Mark is used, × Mark is not used.

Areas	Disc clamper	SQWD33	SQWD11-1	SRNZ010S01	SRNZ010S02
[M], [PA], [PE], [PC]	○	×	×	×	×
[MC]	○	○	×	×	×
[E]	○	×	○	○	○
[EK], [XL], [EG] [EB], [EH], [EF] [Ei], [XB], [XA]	○	×	×	○	○

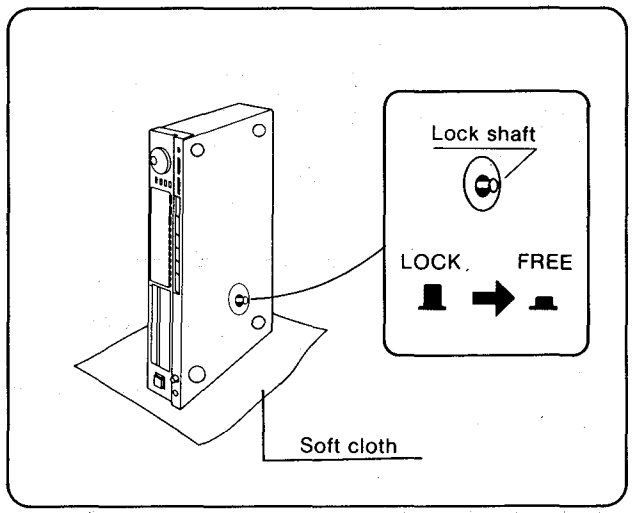

"CAUTION-HAZARDOUS LASER, AND ELECTROMAGNETIC RADIATION WHEN OPEN"
"ATTENTION—RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT"
SQWD33
Disc clamper
DANGER-Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.


ADVARSEL - Usynligt laserlys udstråles ved åbning. UNDGÅ DIREKTE BESTRÅLING. SQWD11-1
VAROITUS! Laite sisältää laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilyä

■ BEFORE USING THIS UNIT

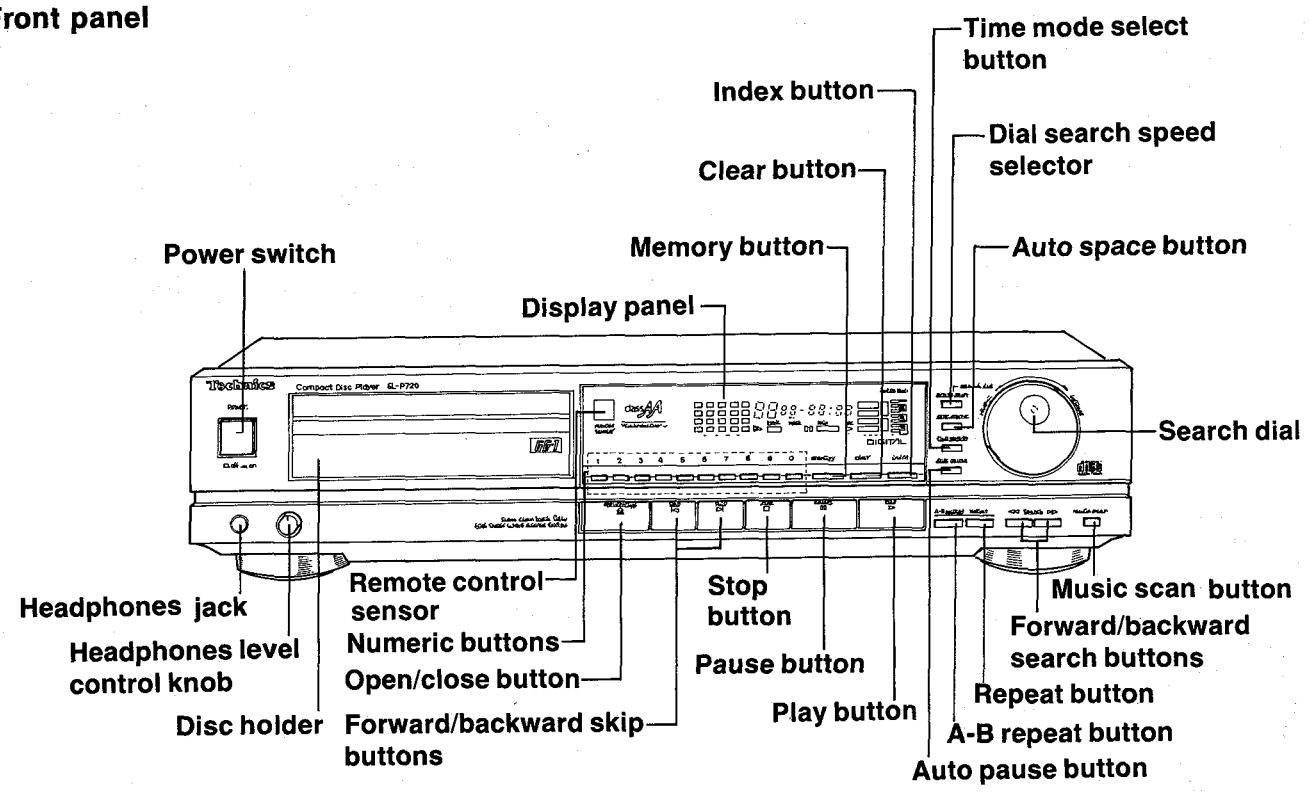
1. Place a soft cloth under the unit to protect it from scratches.
2. Press the lock shaft on the bottom panel to the in (FREE) position (▙▁▟).

NOTE:
IF THE PLAYER IS TRANSPORTED AGAIN, PERFORM THE FOLLOWING STEPS:
1) Remove the disc from the holder.
2) Press the lock shaft to the out (LOCK) position (▟▁▙).
CAUTION:
Do not transport the player without locking the lock shaft.
SEVERE DAMAGE WILL RESULT.

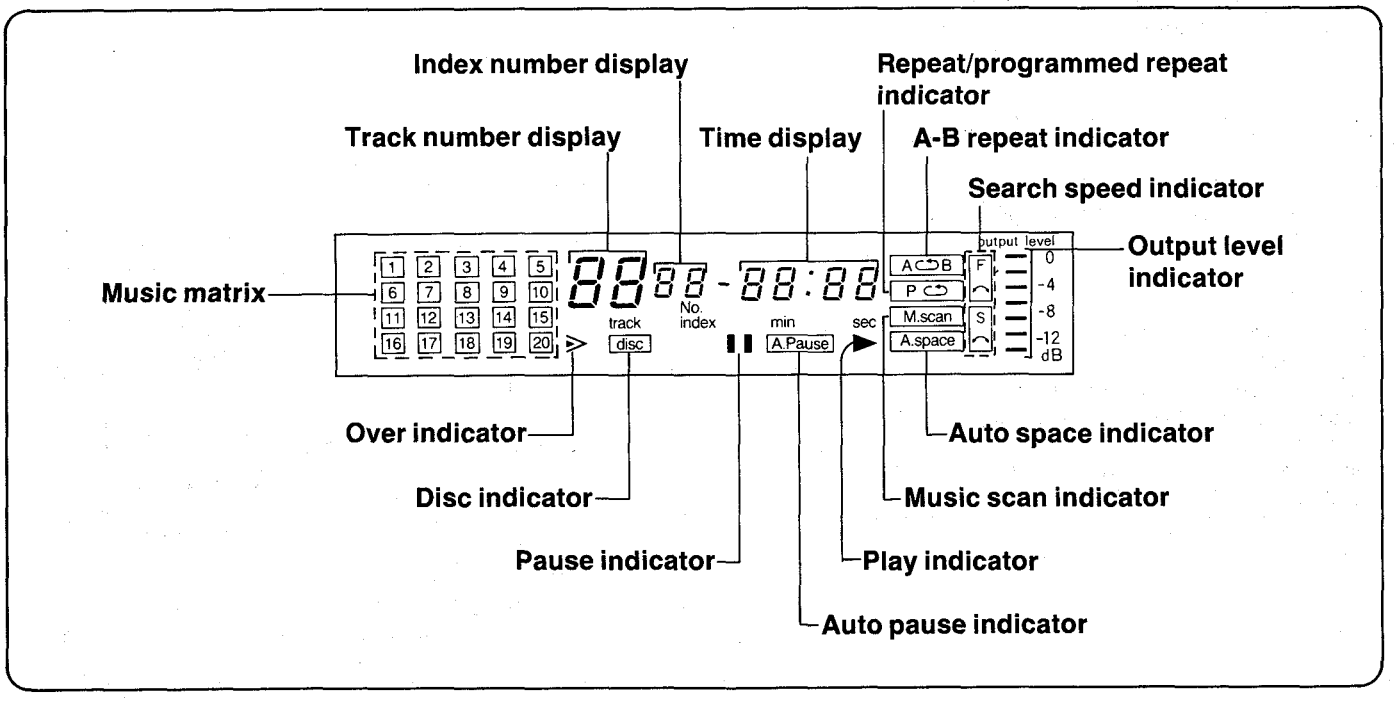


■ LOCATION OF CONTROLS

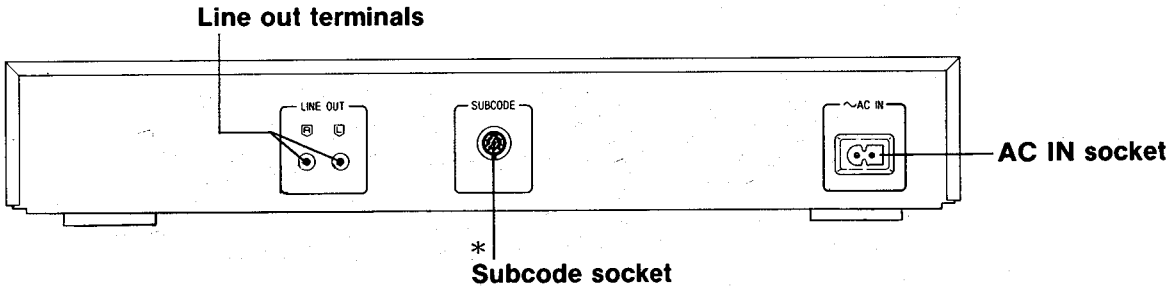
• **Front panel**



• **Display panel**



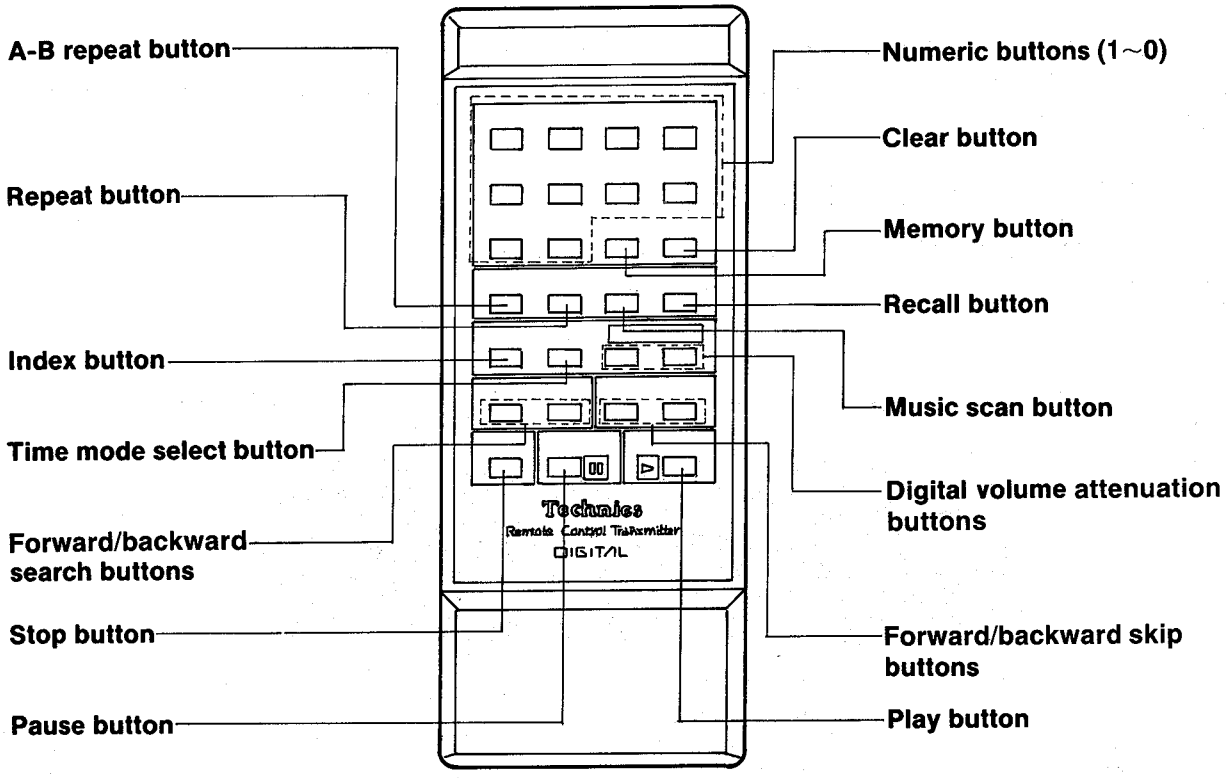
• Rear panel



*** Subcode socket**
The compact disc subcode signal is delivered through this socket.
This socket is provided for system interface with future components.
(Do not connect any components to this socket.)

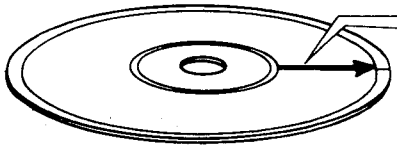
• Remote control unit

SH-R51..... For U.S.A. and Canada (Black Type)
SH-R52..... For others (Black Type)
SH-R52S..... For others (Silver Type)



Playing a disc

All of the examples on pages 6~9 refer to disc which contains 7 tracks and has a total playing time of 49 minutes and 58 seconds, as shown below.



Track 1	Track 2	Track 3	Track 4	Track 5	Track 6	Track 7
5 min.	4 min.	21 min. 58 sec.	5 min.	4 min.	4 min.	6 min.

(Auto-return)

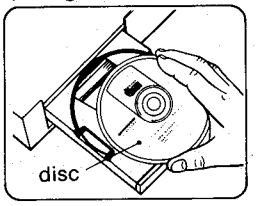
(Stop mode)

1 Automatic play (To play a disc from beginning to end.)

1 Press to turn on (■→▲). (See ① below.)

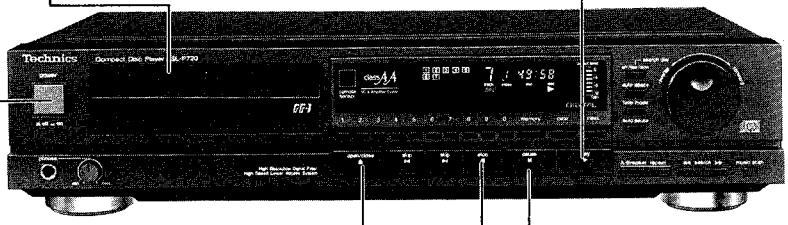
6 Press to turn off. (▲→■). (See ⑨ below.)

3 Insert a disc with the label side facing upward. (See ② below.)



5 Press ▶ to start play. (See ⑤, ⑦ below.)

■ Press to resume play. (See ⑦ below.)



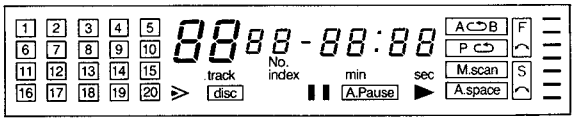
■ Press ❚❚ to briefly interrupt play. (See ⑥ below.)

■ Press ■ to stop play. (See ⑧ below.)

2 Press ⏏ to open disc holder.

4 Press to close disc holder. (See ②, ③ and ④ below.)

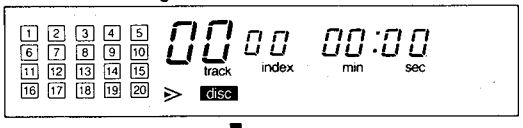
① Display momentarily illuminates as shown below:



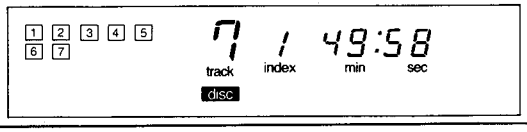
② Insert the disc only after the disc holder has opened all the way. If the disc is inserted too soon, it may be damaged. Do not tilt the player while the disc holder is opening or closing since the disc could fall out of the holder.

③ Step 4 can be skipped by pressing the play button after inserting a disc. In this case, the holder will close and disc play will begin immediately from track 1, but the tracks and total playing time will not be displayed.

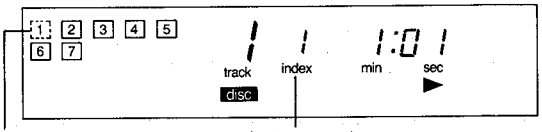
④ Disc data is being read.



Stop mode



⑤ When a disc having no indexes is played " ; " is constantly displayed in the index section.



Flashes on and off. Index number

If the play button is pressed during disc play, disc play is started again from the first track (**auto-return play function**).

⑥ The play indicator (▶) goes out, the pause indicator (❚❚) illuminates and the unit switches to the pause mode.

⑦ The pause mode is cancelled, play is resumed, and the play indicator illuminates.

⑧ The pickup will return to the beginning of the first track and the unit will switch to the stop mode.

⑨ When the end of the disc is reached, the pickup returns to the beginning of the first track and the unit switches to the stop mode.

- Remove the disc from the disc holder.
- Turn off the power if the unit is not to be used again for a while.

- Since steps 1, 2, 3, 4 and 6 in this procedure are the same for all disc play procedures, they are not included in the following explanations.

2 Program play

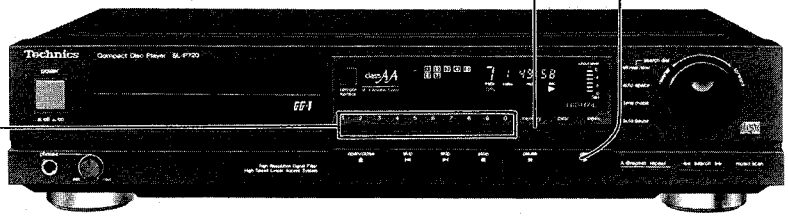
Note:
- Press the repeat button before starting program play if you wish to skip backward during program play.

1 While watching the track number display, press momentarily to specify the desired track number. (See ① below.)

2 Press memory **to enter the displayed track number into memory.** (See ② below.)

3 Repeat steps 1 and 2 until the desired programming is complete. (See ③ below.)

4 Press ► to start play.
- Play begins from the first programmed track.



① -F (error) will be displayed if a track number not on the disc is specified.

② If more than 20 selections are entered, " -F " (full) is shown in the display panel and no further selections can be programmed.
The total track time is also displayed if entires are made when the unit is in the stop mode.

③ To enter the same track number several times in succession, simply press the memory button the same number of times that the track is to be played.
Each entry counts as one selection.

- During programming and program play, track numbers from 1 to 20 are displayed. The ⩾ indicator will illuminate if the disc contains more than 20 tracks and the " - F " indicator will illuminate when a track number higher than 20 is programmed. When a track number higher than 20 is played, the " > " indicator will flash on and off.

- If you make a mistake when entering a track number, press the clear button to cancel that entry. Each time the clear button is pressed, the previous entry is cleared.

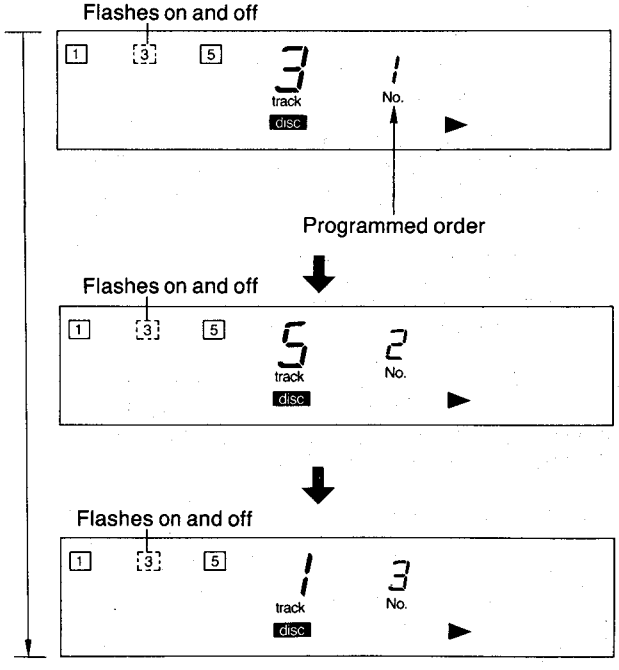
Note:
The clear function will operate only after the memory button has been pressed.
However, if the clear button is pressed during disc play, the entire program is cleared and disc play continues from the current point to the end of the disc.

Entering additional program selections during play:
During play, additional program entries can be made in the same manner as at the time of programming (see above).
- Additional program selections can be entered until a total of 20 selections are programmed.
- If more than 20 selections are entered, - F (full) is shown in the index-number display section of the display panel and further program entries are not accepted.
- All program entries are cancelled when the stop button is pressed, or power is turned off.

■ Program confirmation

Press the recall button on the remote control unit to display the programmed track numbers.
In the example, tracks 3, 5, and 1 are programmed in that order and track 3 is currently being played.

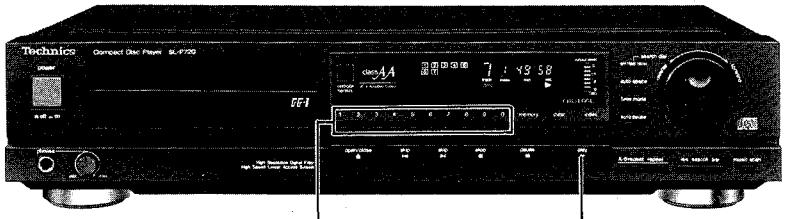
When the recall button is pressed, programmed track (and index) numbers are displayed one by one in the order in which they are to be played.



3 Random access play

■ Track random access

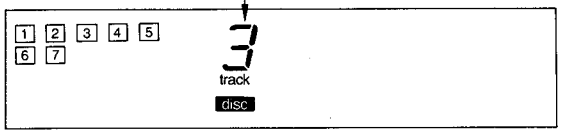
Example: To play a disc from track 3 to the end of the disc.



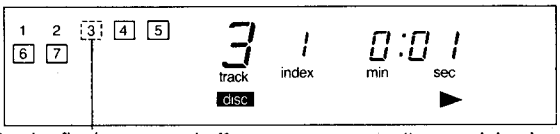
1 Press the numeric button [3] to specify track 3.
(See ① below.)

2 Press [►] to start play.
(See ② below.)

① The display shows track 3 specified.



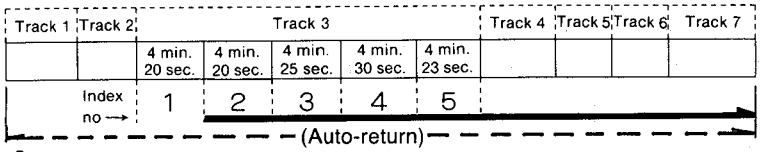
② The play indicator (▶) illuminates and play begins from track 3.



Border flashes on and off as the corresponding track is played.

Note:
If a track number that is non-existent on the disc is programmed the letter "- E " (error) in the display will be displayed.

■ Index random access (When specifying an index number obtained from the disc's liner note)



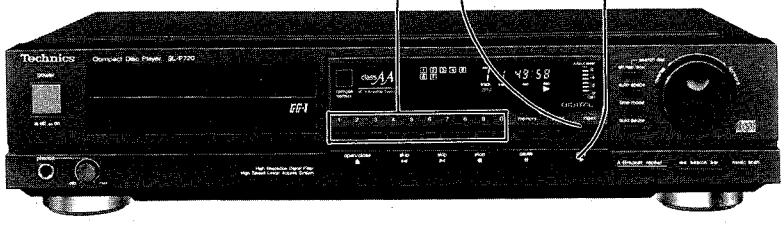
For example: To play from index 2 of track 3 to the end of the disc.

1 Press the numeric button [3] to specify track 3.
(See ① below.)

2 Press [index].
(See ② below.)

3 Press the numeric button [2] to specify index 2.
(See ③ below.)

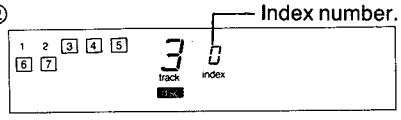
4 Press [►] to start play.
(See ④ below.)



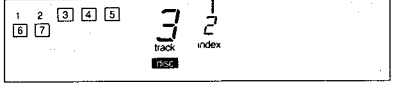
①

When playing discs having only one track, remember to enter track number 1, then specify index number.

②

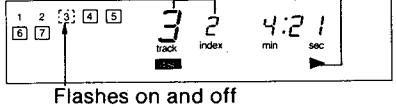


③ Index number is displayed.



Selection can be made up to a maximum of 99.

④ The play indicator (▶) illuminates and disc play begins from index 2 of track 3.



If a index number that is non-extent on the disc is programmed, the last index track will be played.

Flashes on and off

When the end of the disc is reached, the player switches to the stop mode.

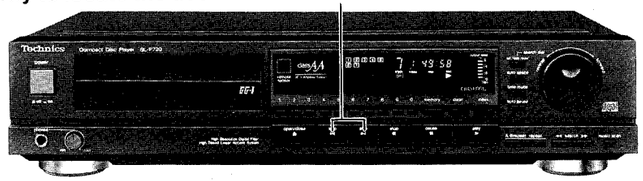
4 Skip play

(During play or in the pause mode.)

■ Forward or backward track skip play

While watching the track number display, press the forward or backward skip button momentarily to locate the desired track.

(See ① below.)



⏭ :
Forward skip button
(Pickup skips forward)

⏮ :
Backward skip button
(Pickup skips backward)

① When either of these buttons is held down, tracks are skipped continuously (quick skip mode).

Forward skip

- During automatic play, the pickup skips to the beginning of the next track each time the button is pressed.
- During program play or program repeat play, the pickup skips to the beginning of the next programmed track each time the button is pressed.

Backward skip

- During automatic play, the pickup skips to the beginning of the current track. If pressed again quickly, the pickup skips to the beginning of the previous track.

5 Search play (forward/backward)

This function allows search to any desired point on the disc.
Search play can be performed as required using either the forward/backward search buttons or the search dial.
Search play can be performed as required using either the forward/backward search buttons or the search dial.

- The position of the pickup is confirmed by watching the display panel or listening to the sound from the compact disc.

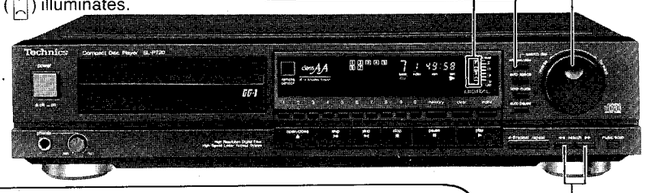
Search play using the search dial (Dial search)

1 Press the dial search speed selector to activate dial search and to select high or low speed for dial search.

The dial search indicator (F) illuminates.
The dial search speed indicator (S) for "slow" or "fast" illuminates also.

2 Turn the search dial clockwise for forward search and counterclockwise for backward search.

(See ①, ② below.)



Search play using the search buttons (Button search)

■ **Keep the forward or backward search button pressed to move the pickup forward or backward.**

(See below 1~2.)

⏩ Forward search button
(Pickup moves forward)

⏪ Backward search button
(Pickup moves backward)

1 When one of these buttons is held down, the pickup will move slowly at first.

2 When one of these buttons is held down for more than about 3 seconds, the pickup will move rapidly.

- Release the button when the desired point has been reached (as shown by the display).
- If these buttons are pressed during play, sound can be heard during the search operation.
  During steps 1 and 2, the output level is decreased by −12 dB (¼) compared with the normal level.
- During program play, the pickup can only be moved between the beginning and end of the track currently being played.

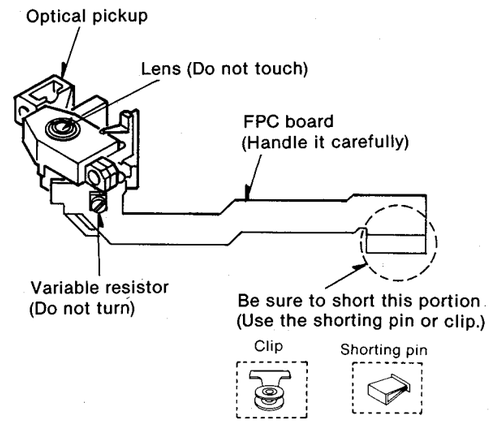
① The search speed changes according to the speed the search dial is turned, however, it will not become faster or slower than its determined limits.
② The search speed is different during play and while the unit is in the pause mode.

■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the optical pickup may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the optical pickup.

• Handling of optical pickup

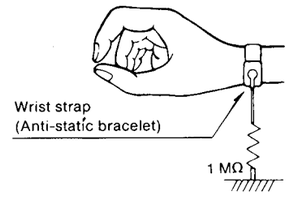
1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board. **(FPC board)**
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board. **(FPC board)**
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

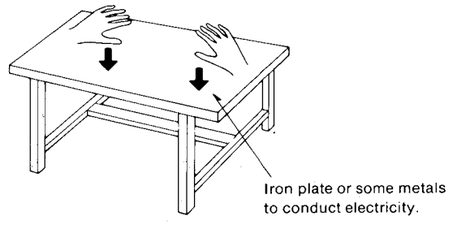


• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to relieve the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the optical pickup.



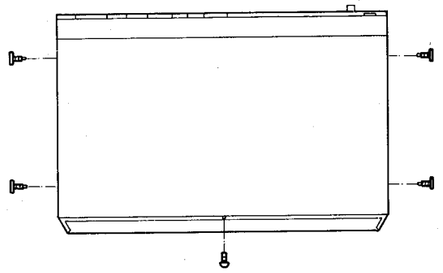


■ DISASSEMBLY INSTRUCTIONS

CAUTION:

- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When doing the job, removing the cabinet and disc clamper of this unit, be sure to turn the power supply off.

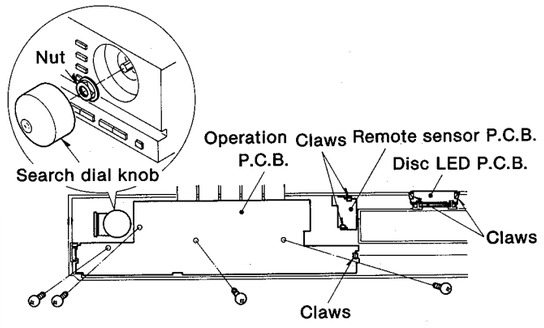
Ref. No. 1	How to remove the cabinet
Procedure 1	• Remove the 5 set screws.

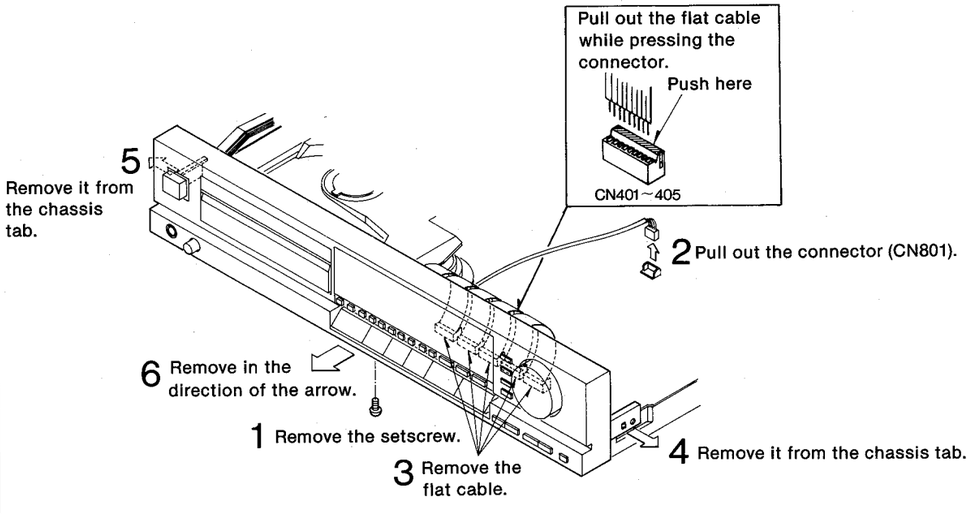


Note: When doing the job, Lock the lock shaft at bottom of the unit. (see page 3)

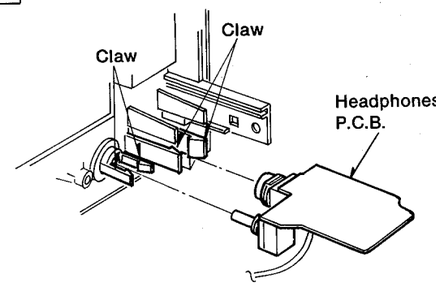
Ref. No. 2	How to remove the front panel
Procedure 1 → 2	• Remove in the numerical order shown.

Ref. No. 3	How to remove the operation P.C.B.
Procedure 1 → 2 → 3	1. Remove the search dial knob and nut. 2. Release the 4 claws of the remote sensor and disc LED P.C.B. 3. Remove the 4 setscrews. 4. Release the claw of the operation P.C.B.

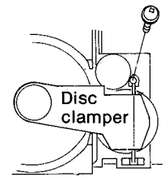



Pull out the flat cable while pressing the connector.
Push here
CN401 – 405
5 Remove it from the chassis tab.
2 Pull out the connector (CN801).
6 Remove in the direction of the arrow.
1 Remove the setscrew.
3 Remove the flat cable.
4 Remove it from the chassis tab.

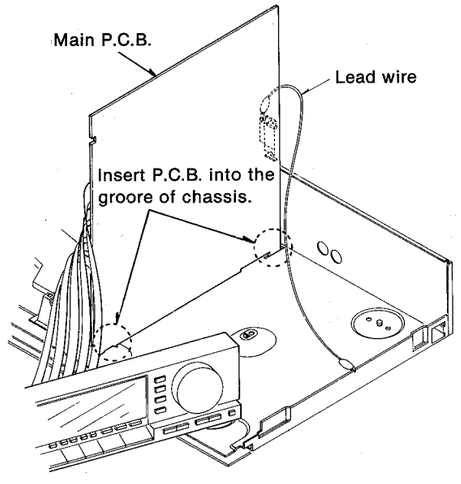
Ref. No. 4	How to remove the headphones P.C.B.
Procedure 1 → 2 → 4	• Release the 4 claws.



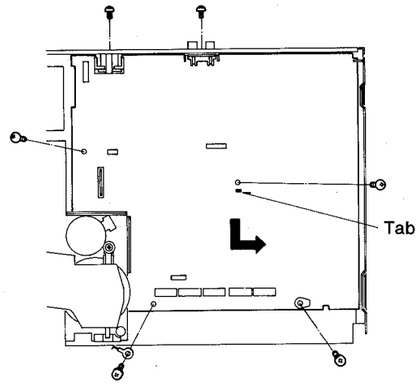
Ref. No. 6	How to remove the disc clamper
Procedure 1 → 6	• Remove the setscrew.



1. Be sure to connect the P.C.B. ground terminal (Line out terminal) and chassis with a lead wire.
2. Connect the ground wire of loading base to the chassis.



Ref. No. 5	How to remove the main P.C.B.
Procedure 1 → 2 → 5	1. Remove the 6 setscrews. 2. Lift the P.C.B. to remove it from the chassis tab. 3. Remove in the direction of the arrow.

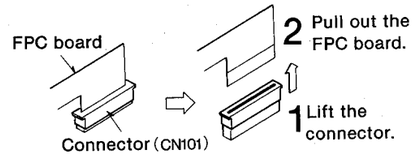


How to check the main P.C.B.

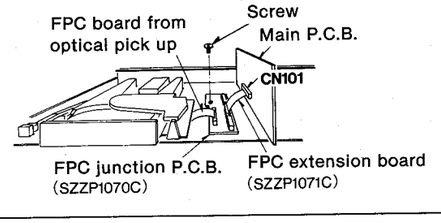
- When checking the soldered surfaces of main P.C.B. and replacing the parts, do as shown.

1. Remove the FPC board.

Caution: Insert the short pin into the FPC board in order to prevent breakdown of laser diode. (See page 10)



2. Mount FPC junction P.C.B. (SZZP1070C) on the chassis. (Do the job as shown by using the main P.C.B. setscrew.)
3. Connect FPC board from optical pickup to FPC junction P.C.B.
4. Connect FPC extension board (SZZP1071C) to FPC junction P.C.B. and CN101 of main P.C.B.



Ref. No. 7 — **How to remove the loading base**

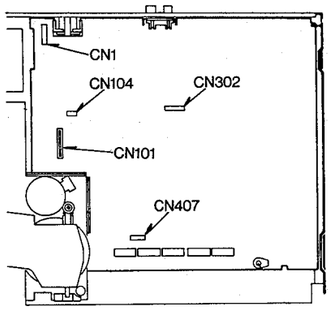
Procedure 1 → 2 → 7

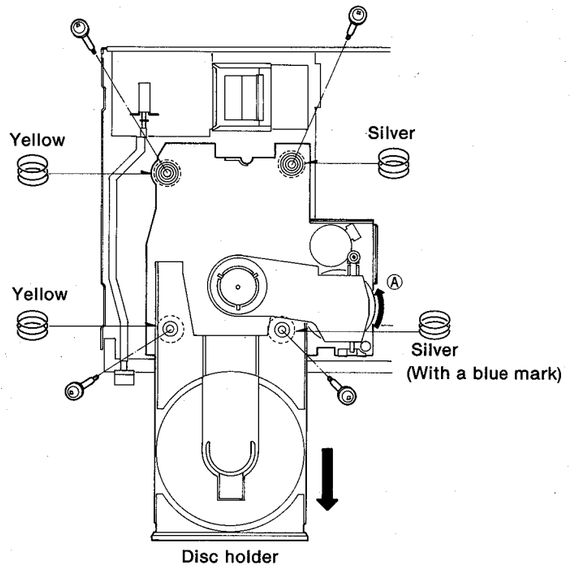
Refer to the optical pickup handling precautions (See page 10).

1. Turn the drive gear in the direction of arrow Ⓐ, and shift the disc holder forward.
2. Remove the 4 setscrews.

Caution: The color of each spring, they must be reinstalled in their original position.

3. Pull out the 4 connectors (CN1, CN104, CN302, CN407).
4. Remove the FPC board (CN101).

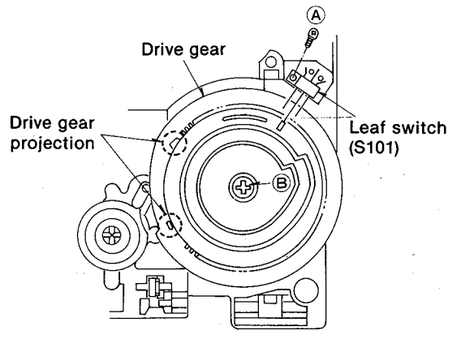




Ref. No. 8 — **How to remove the disc holder (disc tray)**

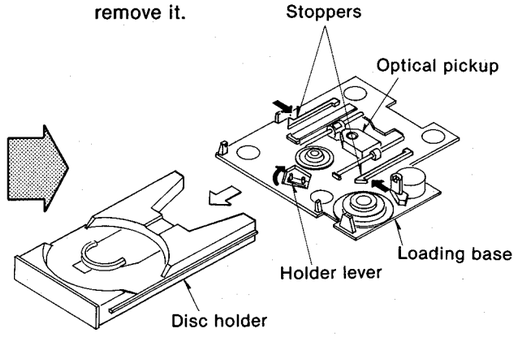
Procedure 1 → 2 → 6 → 8

- **Set the drive gear as shown below.** (Turn it completely to the right, then turn it to the left by about 20° so that drive gear teeth or projection will not touch the rack of disc holder.)



- **To remove the drive gear**
  Remove the screw Ⓐ of leaf switch (S101), then remove the drive gear setscrew Ⓑ.

1. Push the holder lever backward, (From underneath the loading base.)
2. Pull the disc holder and bend the 2 claws of disc holder stopper of loading base toward the optical pickup.
3. Further pull out the disc holder to remove it.



- **Caution for fitting**
  When fitting the disc holder, make the drive gear as shown on the left, and then insert the disc holder along the guide of loading base. After inserting the disc holder completely, turn the drive gear to the right completely.

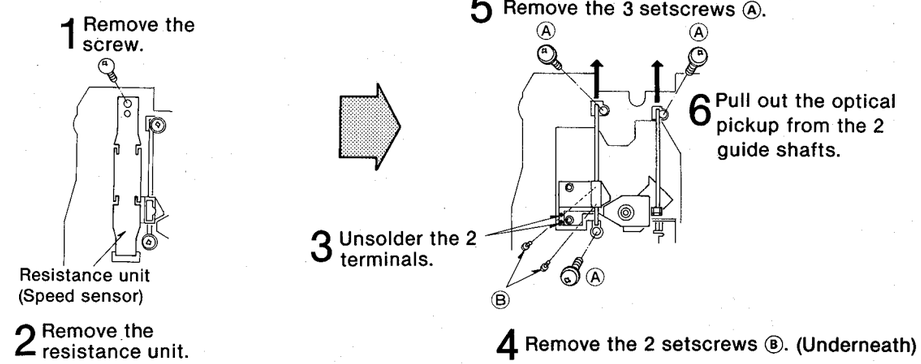
Ref. No. 9 — **How to remove the optical pick up**

Procedure 7 → 8 → 9

- Remove in the numerical order shown.

Note: Lock the lock shaft at the bottom of the unit.

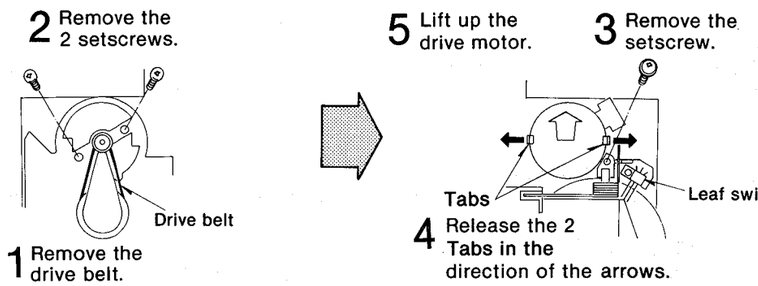
Refer to the optical pickup handling precautions (See page 10).


1 Remove the screw.
Resistance unit (Speed sensor)
2 Remove the resistance unit.
3 Unsolder the 2 terminals.
5 Remove the 3 setscrews Ⓐ.
Ⓐ
Ⓐ
6 Pull out the optical pickup from the 2 guide shafts.
Ⓑ
Ⓐ
4 Remove the 2 setscrews Ⓑ. (Underneath)

Ref. No. 10 — **How to remove the drive motor**

Procedure 7 → 10

- Remove in the numerical order shown.

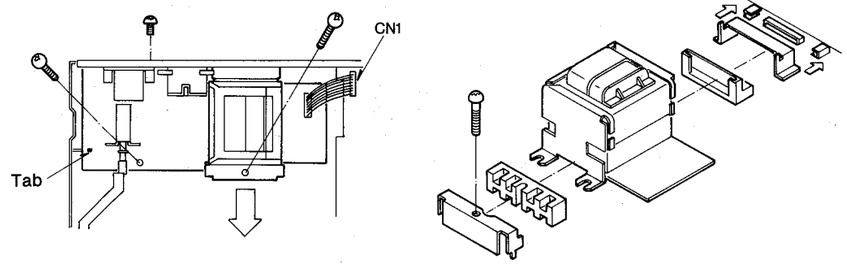

2 Remove the 2 setscrews.
Drive belt
1 Remove the drive belt.
5 Lift up the drive motor.
3 Remove the setscrew.
Tabs
Leaf switch (S101)
4 Release the 2 Tabs in the direction of the arrows.

Ref. No. 11 — **How to remove the power transformer**

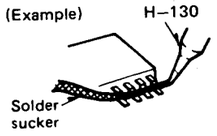
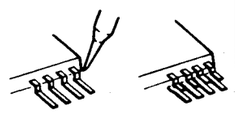
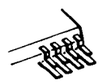
Procedure 7 → 11

1. Remove the connector (CN1).
2. Remove the 3 setscrews.
3. Remove it from the chassis tab.
4. Remove in the direction of the arrow.

Note: When replacing the power transformer, do as shown.



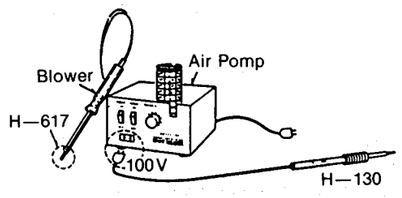
■ HOW TO REPLACE IC'S (Small outline type)

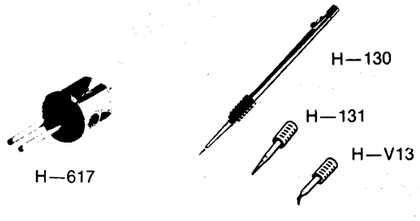
	Replacing procedure		Cautions
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.	(Example) H–130 	• Recommended tool .....Special soldering iron * H605M and H-130. * H605E and H-130. • Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil. • When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil. • When using a pencil type soldering iron. 1. Completely remove the solder from each IC pin by use of solder sucker. 2. Raise each pin by means of an eyeleteer, hold the pliers then remove IC package from P.C.B.
2	Melt the solder on the pin (one electrode) with the soldering iron.		
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.		
4	Remove each pin from the foil according to the above-mentioned procedure.		

*** Special soldering iron**
(Refer to Technical Information, ORDER NO. GAD84125486T1)...For U.S.A. and Canada
(Refer to Technical Information, ORDER NO. GAD84115476T8)...For others

•H–605 Spot Heater (hot-air solder iron)
This device that uses hot air to melt solder was developed to remove Flat-Package ICs, RHCs and chip parts.

- H–605M (For 120V power source)
- H–605E (For 200V/220V/240V power source)





•H–617 Twin Nozzle (for spot heater)
Special nozzle for the removal of RHCs and chip resistors. (Nozzle diameter: 1.0mm×2)

•H–130 Slim Pencil Solder Iron
An ultrasmall ceramic heater solder iron is extremely handy for soldering chip parts, RHCs, ICs etc., to high-density circuit boards.
Features:
- Rated power: 100V, 15W
- Max. temp.: 400°C
- Heater: ceramic (long life)
- Insulation resistance: 100MΩ
- Length: 178mm
- Weight: 16g (not including cord)

•H–131, H–V13 Cap Bits
Solder tip for the slim pencil Solder Iron is composed of a bit holder and a corrosion resistance solder tip.
Permits changing of solder tips even while still hot.
- Solder tip: 0.3mm

■ TERMINAL FUNCTION OF LSI

• MN15283PDP (System Control and FL Drive)

Pin No.	Mark	Singnal	I/O Devision	Function
1	VSS	GND	I	GND terminal
2	X0	——	O	Not used (Open)
3	X1	SENSE	I	Optical servo condition input
4	P00	MRLY	O	Muting control signal (muting ON at "H")
5	P01	M DATA	O	Command data output
6	P02	MCLK	O	Command clock output
7	P03	MLD	O	Command load output
8	P10	——	I	Search dial signal input
9	P11	——	I	Search dial signal input
10	P12	——	——	Not used (Open)
11	P13	——	——	———
12	$\overline{SYNC}$	——	——	Not used (Open)
13	$\overline{RST}$	RESET	I	Reset signal input (reset at "L")
14	$\overline{IRQ}$	BLKCK	I	Sub-code block (Q data) clock (75Hz) input
15 ∫ 18	P50 ∫ P53	KEY	I	Key scan input
19	$\overline{SBT}$	$\overline{CLDCK}$	I	Sub-code frame clock (7.35kHz)
20	$\overline{SBD}$	SUBQ	I	Sub-code Q data input
21	P20	SEEK	——	———
22	P21	——	——	Not used (Open)
23	P22	$\overline{TRV\text{-}R}$	O	Traverse reverse command signal
24	P23	$\overline{RRV\text{-}F}$	O	Traverse forward command signal
25	P30	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)
26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
29	P40	STAT	I	Processing status input from signal processing LSI traverse position detection
30	P41	COMP	——	Not used (Open)
31	P42	$\overline{FLOCK}$	I	Optical servo condition (focus) input
32	P43	$\overline{SENSE}$	I	Optical servo condition (track cross) input
33	P60	$\overline{CLOSE}$	O	Loading motor close command (ON at "L")
34	P61	$\overline{OPEN}$	O	Loading motor open command (ON at "L")
35	DAC	DAC	O	———
36	VPP	——	I	FL drive power supply (connected to −32V)
37 ∫ 52	D0 ∫ DD	——	O	FL grid signal and key scan signal
53 ∫ 61	S8 ∫ S0	——	O	FL anode signal
62	VDD	——	I	Power supply (connected to +5V)
63	OSC2	——	I	Clock terminal
64	OSC1	——	I	Clock input

• MN1550PDM (Remote Control Signal Processing)

Pin No.	Mark	Singnal	I/O Devision	Function
1	VDD	——	I	Power supply (connected to +5V)
2	OSC	SMCK	I	Clock input
3	P23	——	——	———
4	P22	——	——	———
5	RST	RESET	I	Reset signal input
6	P21	——	——	———
7	P20	——	I	Remote control signal input
8	IRQ	——	I	Program enable/de-enable control
9	P31	——	——	———
10 ∫ 13	P10 ∫ P13	Data	I	Key strobe
14 ∫ 17	P00 ∫ P03	Data		
18	VSS	GND	I	GND terminal

• MN6617 (Digital Signal Processing: EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O Devision	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
2	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
3	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
4	CRC	O	Sub-code (Q data) CRC check (Not used, open)
5.	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
6	MLD	I	Command load input
7	MCLK	I	Command clock input
8	MDATA	I	Command data input
9	DMUTE	I	Muting control (muting ON at "H")
10	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output
12	SMCK	O	Clock output (4.2336 MHz)
13	PMCK	O	Pitch control clock output Not used, open)
14	ITC	I	Track counter input signal (Not used, open)
15	$\overline{\text{TEST}}$	I	Test mode selection (Not used, connected to +5V)
16	X2	O	Clock output (16.9344 MHz)
17	X1	I	Clock input (16.9344 MHz)
18	SEL	I	DA output parallel/serial selection (serial at "L")
19	LDG/WDCK	O	L channel deglitch signal/serial data word clock. (Not used, open)
20	RDG	O	Spindle motor control clock signal
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
22	IPFLAG	O	Interpolation flag (interpolation at "H")
23	FLAG0	O	Error flag (error at "H")
24	FLAG6	O	16K RAM address reset signal (reset at "H")
25	XCK	O	Clock (16.9344 MHz) output
26	DA15/ SRDATA	O	16-bit data output/serial data output (MSB first)
27	DA14/ SRDATAX	O	16-bit data output/serial data output (LSB first)
28	DA13/SRCK	O	16-bit data output/serial data beat clock
29	DA12/WDCK	O	16-bit data output/serial data word clock (Not used)
30	DA11/ BYTCK	O	16-bit data output/serial data byte clock (Not used)
31	GND	I	GND terminal
32	DA10/R/L	O	16-bit data output/R/L signal
33	DA9/RESY	O	16-bit data output/ Resynchronizing signal
34	DA8/FCLV	O	16-bit data output/Synchronizing detection signal (Nor used)
35	DA7/ IPBYTE	O	16-bit data output/Interpolation flag for each byte (Not used)
36	DA6/IPSEL	I/O	16-bit data output/ interpolation inhibit (Nor used)
37	DA5/FLAG5	O	16-bit data output/C2 decoder correction flag 3 (Not used)
38	DA4/FLAG4	O	16-bit data output/C2 decoder correction flag 2 (Not used)
39	DA3/FLAG3	O	16-bit data output/C2 decoder correction flag 1 (Not used)
40	DA2/FLAG2	O	16-bit data output/C1 decoder correction flag 2 (Not used)
41	DA1/FLAG1	O	16-bit data output/C1 decoder correction flag 1 (Not used)
42	DA0/FLCK0	O	16-bit data output/Crystal frame clock
43 ⟆ 50	D7 ⟆ D0	I/O	16K RAM data output
51	RAMOE	O	16K RAM $\overline{\text{OE}}$ signal
52	RAMWE	O	16K RAM $\overline{\text{WE}}$ signal
53 ⟆ 63	RAMA 0 ⟆ RAMA10	O	16K RAM address signal (RAMA0: LSB, RAMA10: MSB)
64	PC	O	Spindle motor ON signal (ON at "L")
65	EC	O	Spindle motor drive signal
66	FG	I	Spindle motor FG signal input
67	VCNT	——	———
68	REXT	——	———
69	VDD	I	Power supply (connected to +5V)
70	PD	——	———
71	PCKO	——	———
72	PCK	I	PLL extract clock input
73	VDD	I	Power supply (connected to +5V)
74	EFM	I	EFM signal input (PLL)
75	SRF	I	EFM signal input (DSL)
76	DO	I	Drop-out signal (Drop-out at "H")
77	CLVS	O	11T servo OK signal (OK at "H")
78	FPC	O	PLL frequency comparision signal
79	RSSEL	O	PLL frequency in take operation signal
80	SRFO	——	———
81	NSRF	——	———
82	RF	——	———
83	SUBC	O	Sub-code serial output data
84	SBCK	I	Clock for sub-code serial output

• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O Devision	Function
1	VEE	I	Power supply (connected to −5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE+	I	Phase difference-voltage conversion (+)
9	TE−	I	Phase difference-voltage conversion (−)
10	APC−	O	Laser Power inversion input
11	C•MEM	I	Capacitor connection for phase difference memory
12	APC+	I	Laser power non-inversion input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, open)
18	C•MSP	I	Track-cross reference speed setting capacitor connection (not used, open)
19	C•AF	I	Auto focus timer capacitor connection
20	KICK R/$\overline{\text{F}}$	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)
22	CNT1	I	Control input (FOON: Focus servo ON signal)
23	CNT2	I	Control input ($\overline{\text{TRON}}$: Tracking servo ON signal)
24	CNT3	I	Control input (KICKF: Kick direction [forward] command)
25	CNT4	I	Control input (KICKR: Kick direction [reverse] command)
26	$\overline{\text{F•LOCK}}$	O	Focus lock signal output
27	C•FBDO	O	Capacitor connection for inversion RF high speed detection
28	C•SBDO	O	Capacitor connection for inversion RF low speed detection
29	C•SBRT	O	Capaictor connection for non-inversion RF low speed detection
30	C•FBRT	O	Capacitor connection for non-inversion RF high speed detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RFIN	I	RF signal input
34	S•OUT	O	Focus search signal output
35	C•LW	I	Capacitor connection for triangular wave generation
36	FE•OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE•REF	I	Focus error comparision voltage generation
39	PDB	I	Photo detector current input (B)
40	IVB	O	Current/voltage conversion output (B)
41	IVA	O	Current/voltage conversion output (A)
42	PDA	I	Photo detector current input (A)

• EHDGA1243 (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function
1	PCK	O	Clock output extracted from SRF
2	EFM	O	EFM signal output synchronized with PCK
3	D•GND	I	GND terminal (digital system)
4	SRF	O	RF signal output data-sliced into digital value
5	SLC	I	Slice level control signal input
6	DC	O	Drop-out detection pulse output
7	FPC	I	Frequency comparison error signal input
8	VCC	I	Power supply (connected to +5V)
9	NC	——	Non connection
10	VR	I	Resistor connection for VCO oscillation frequency
11	VEE	I	Power supply (connected to −5V)
12	VC1	I	Capacitor connection for VCO oscillator frequency
13	VC2	I	Capacitor connection for VCO oscillator frequency
14	A•GND	I	GND terminal (analog system)
15	RF	I	RF signal input

• MN6618A (Digital Filter)

Pin No.	Mark	I/O Devision	Function
1	———	———	———
2	D012	O	16-bit parallel data output
3	D011/SCK	O	16-bit parallel data output/ serial output bit clock
4	D010/SOUT	O	16-bit parallel data output/ serial output data
5	GND	I	GND terminal
6	D09	O	16-bit paralled data
7	———	———	———
8	D08	O	16-bit parallel data
9	D07	O	16-bit parallel data
10	———	———	———
11	———	———	———
12	D06	O	16-bit parallel data
13	D05	O	16-bit parallel data
14	D04	O	16-bit parallel data
15	D03/LRCK	O	16-bit parallel data/RL signal
16	———	———	———
17	———	———	———
18	D02/WCK	O	16-bit parallel data/serial output word clock
19	D01	O	16-bit parallel data
20	D00	O	16-bit parallel data (LSB)
21	MDATA	I	Command data input

Pin No.	Mark	I/O Devision	Function
22	———	———	———
23	MCLK	I	Command clock input
24	MLD	I	Command load input
25	———	———	———
26	$\overline{RST}$	I	Reset signal input (reset at "L")
27	———	———	———
28	LRCK	I	R/L signal
29	———	———	———
30	SFT	I	Serial data input clock
31	SIN	I	Serial data input
32	———	———	———
33	X OUT	O	Clock output (Not used)
34	X IN	I	Clock input (16.9344 MHz)
35	OSEL	I	DA output parallel/serial selection (parallel at "L")
36	LDGL	O	L channel deglitch signal
37	RDGL	O	R channel deglitch signal
38	VDD	I	Power supply (connected to +5V)
39	D015	O	16-bit parallel data (MSB)
40	D014	O	16-bit parallel data
41	———	———	———
42	D013	O	16-bit parallel data

• AN8290S (Spindle Motor Drive)

Pin No.	Mark	I/O Devision	Function
1	GND	I	Minimum potential of IC control. (In this unit, it is connected to VEE [−7.6V].)
2	DCR	I	Standard voltage of FA1, PC, CLK. (In this unit, it is connected to 2.5V.)
3	FAI	I	Torque command filter amp. input. (Normal rotation command when FAI < DCR.)
4	FAO	O	Filter amp. output.
5	D1	I	Absolute value circuit input.
6	LPF	I	Capacitor terminal for low pass filter of current feedback loop.
7	A1	O	Drive signal output.
8	A2	O	
9	A3	O	
10	PGND	1	Minimum potential of IC power. (In this unit, it is connected to VEE [−7.6V]).
11	CS	I	Dive current detection resistor terminal.
12	PVCC	I	Power input for IC power.

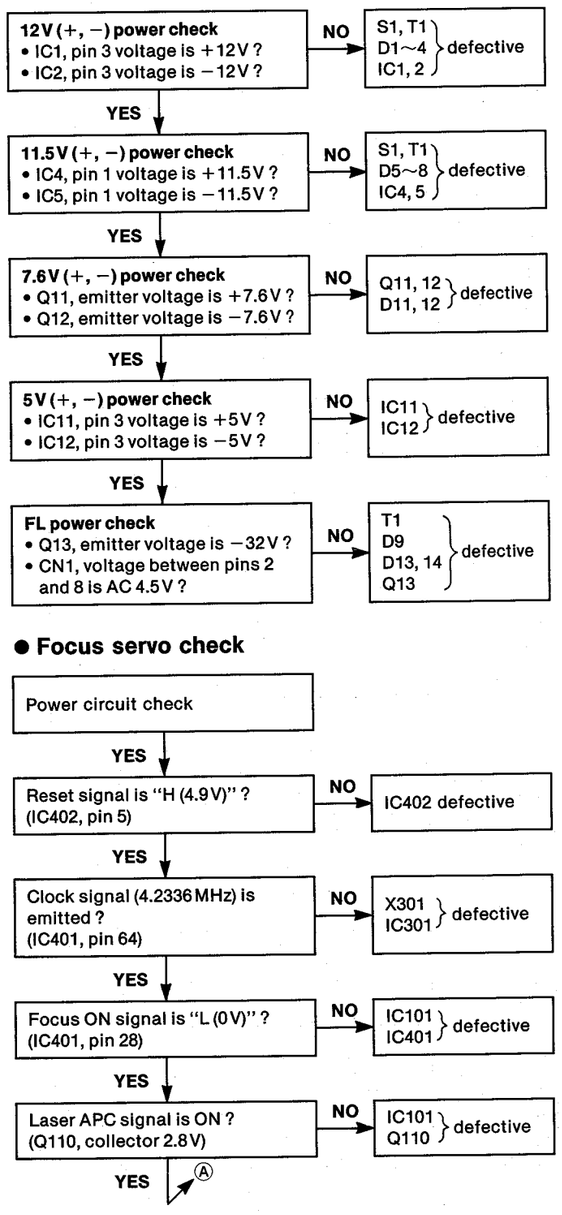
Pin No.	Mark	I/O Devision	Function
13	H3−	I	Not used in this unit.
14	H3+	I	
15	H2−	I	Negative output of Hall element is input.
16	H2+	I	Positive output of Hall element is input.
17	H1−	I	Negative output of Hall element is input.
18	H1+	I	Positive output of Hall element is input.
19	HSW	I	Bias switch of Hall element. (OFF when PC > DCR)
20	HB	I	Bias power of Hall element.
21	VCC	I	Power input for IC control.
22	PC	I	Power control. (Power down mode when PC > DCR)
23	CLK	I	Clock input. (DCR standard, operated at the edge of rise.)
24	TC	I	Triangular wave generation capacitor terminal.

■ TROUBLESHOOTING

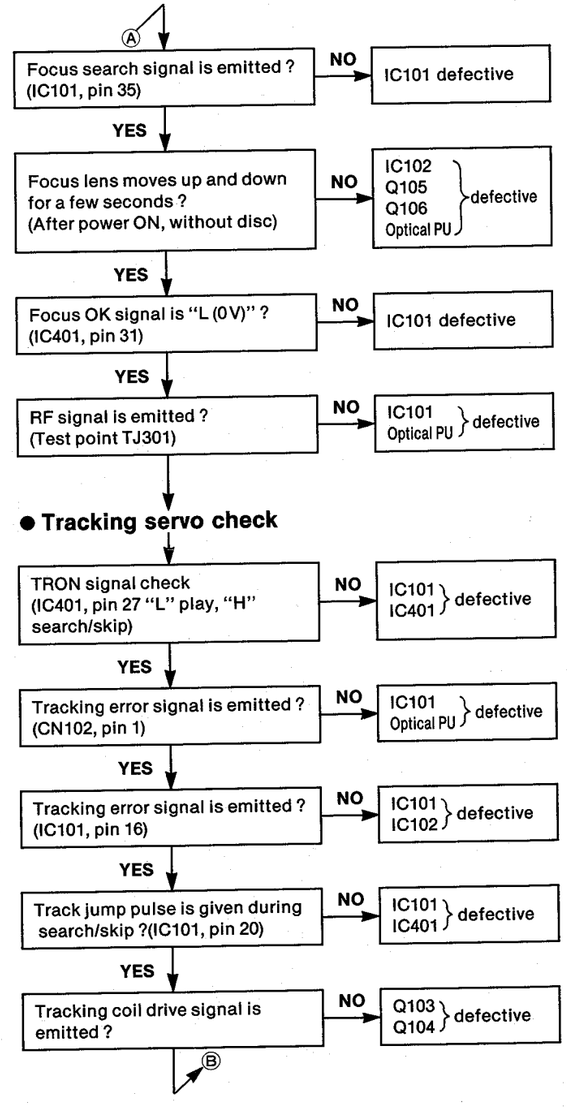
Notes:

1. Before using this unit, release the lock shaft which secures the pick-up at the bottom of the unit.
2. Carefully handle the compact disc because stains, dust or warping may cause generation of noise.
3. For the voltage value and waveform, refer to the schematic diagram. (The voltage value and waveform slightly varies depending on the measuring set and tester.)
4. The possible defects are mainly shown by semiconductors. The adjacent electronic circuits (C, R, etc.) are omitted.

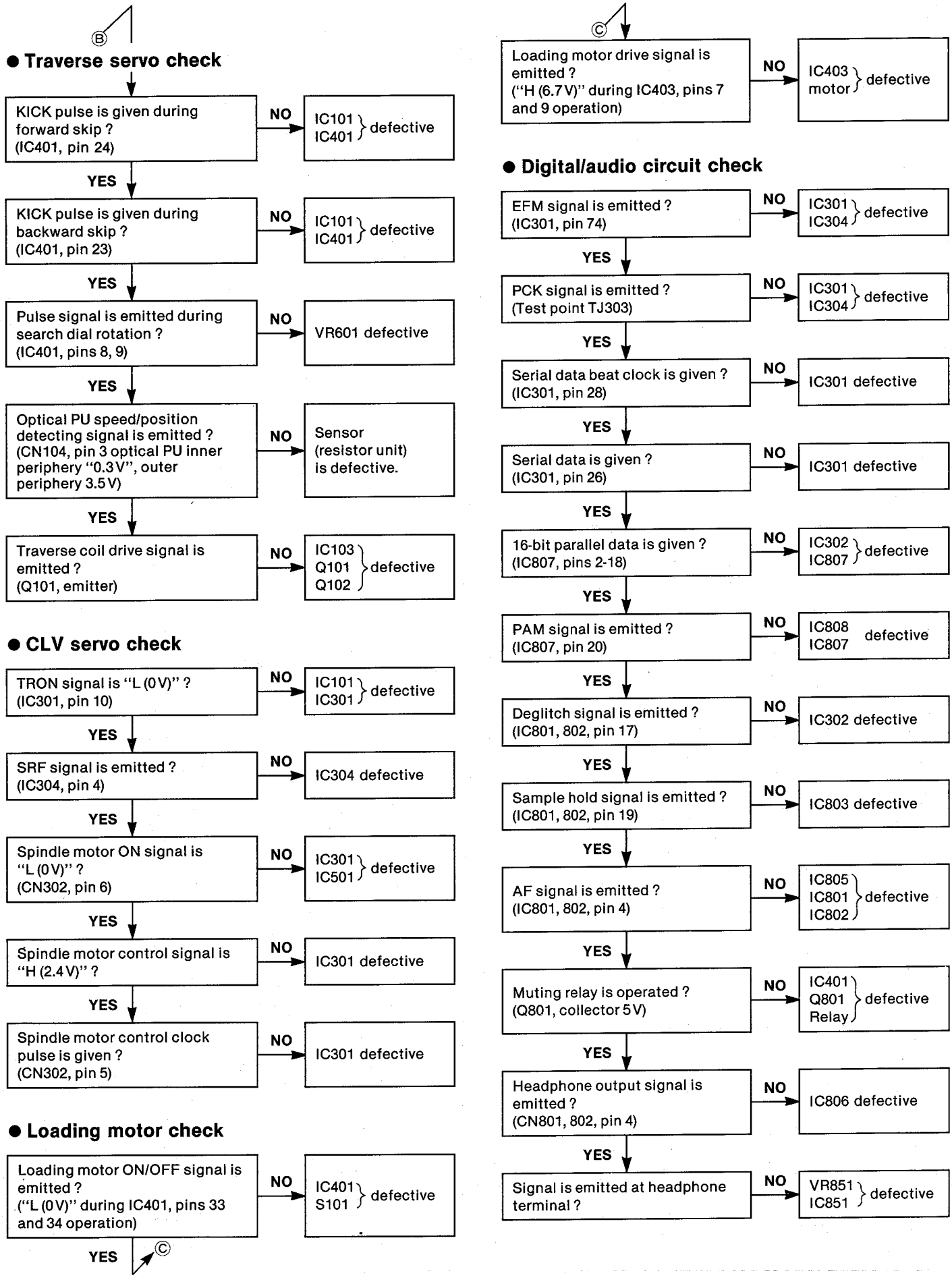
● Power circuit check



● Focus servo check



● Tracking servo check


Ⓑ
● Traverse servo check
KICK pulse is given during forward skip ? (IC401, pin 24)
NO
IC101 IC401 defective
YES
KICK pulse is given during backward skip ? (IC401, pin 23)
NO
IC101 IC401 defective
YES
Pulse signal is emitted during search dial rotation ? (IC401, pins 8, 9)
NO
VR601 defective
YES
Optical PU speed/position detecting signal is emitted ? (CN104, pin 3 optical PU inner periphery "0.3 V", outer periphery 3.5 V)
NO
Sensor (resistor unit) is defective.
YES
Traverse coil drive signal is emitted ? (Q101, emitter)
NO
IC103 Q101 Q102 defective
● CLV servo check
TRON signal is "L (0 V)" ? (IC301, pin 10)
NO
IC101 IC301 defective
YES
SRF signal is emitted ? (IC304, pin 4)
NO
IC304 defective
YES
Spindle motor ON signal is "L (0 V)" ? (CN302, pin 6)
NO
IC301 IC501 defective
YES
Spindle motor control signal is "H (2.4 V)" ?
NO
IC301 defective
YES
Spindle motor control clock pulse is given ? (CN302, pin 5)
NO
IC301 defective
● Loading motor check
Loading motor ON/OFF signal is emitted ? ("L (0 V)" during IC401, pins 33 and 34 operation)
NO
IC401 S101 defective
YES
Ⓒ
Ⓒ
Loading motor drive signal is emitted ? ("H (6.7 V)" during IC403, pins 7 and 9 operation)
NO
IC403 motor defective
● Digital/audio circuit check
EFM signal is emitted ? (IC301, pin 74)
NO
IC301 IC304 defective
YES
PCK signal is emitted ? (Test point TJ303)
NO
IC301 IC304 defective
YES
Serial data beat clock is given ? (IC301, pin 28)
NO
IC301 defective
YES
Serial data is given ? (IC301, pin 26)
NO
IC301 defective
YES
16-bit parallel data is given ? (IC807, pins 2-18)
NO
IC302 IC807 defective
YES
PAM signal is emitted ? (IC807, pin 20)
NO
IC808 IC807 defective
YES
Deglitch signal is emitted ? (IC801, 802, pin 17)
NO
IC302 defective
YES
Sample hold signal is emitted ? (IC801, 802, pin 19)
NO
IC803 defective
YES
AF signal is emitted ? (IC801, 802, pin 4)
NO
IC805 IC801 IC802 defective
YES
Muting relay is operated ? (Q801, collector 5 V)
NO
IC401 Q801 Relay defective
YES
Headphone output signal is emitted ? (CN801, 802, pin 4)
NO
IC806 defective
YES
Signal is emitted at headphone terminal ?
NO
VR851 IC851 defective

■ RESISTORS & CAPACITORS

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value

ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value 47x10¹ (ohm)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	330
Type	Voltage	Peculiarity	Value (33x10° microfarad)

Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide ERX : Metal Film ERQ : Fuse Type Metal ERD□□ L : Carbon (chip) ERO□□ K : Metal Film (chip) ERC : Solid	10 : 1/8W 12 : 1/2W 25 : 1/4W 1A : 1W 18 : 1/8W S2 : 1/4W S1 : 1/2W 2F : 1/4W 50 : 1/2W 2A : 2W	J : ±5% F : ±1% G : ±2% K : ±10%

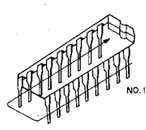
Capacitor Type	Voltage	Tolerance
ECE : Electrolytic ECCD : Ceramic ECKD : Ceramic ECQM : Polyester ECQP : Polyproylene ECG : Ceramic ECEA□□□N: Non Polar Electrolytic QCU□ : Ceramic (Chip Type) ECUX : Ceramic (Chip Type) ECF : Semiconductor EECW : Liquid electrolyte double layer capcitor	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1H : 50V 1V : 35V 50 : 50V 05 : 50V 2H : 500V 2A : 100V 1 : 100V KC: 400V AC KC: 125VAC (UL) 1J : 63V	C : ±0.25pF J : ±5% K : ±10% Z : +80% −20% P : +100% −0% M : ±20% D : ±0.5pF G : ±2%

Ref. No.	Part No.	Part Code
RESISTORS		
R11, R12	ERDS2TJ102	001 152 2346 4
R13	ERDS2TJ222	001 152 2353 5
R14 ⚠	ERDS2TJ822	001 152 2455 0
R102	ERDS2TJ222	001 152 2353 5
R103	ERDS2TJ273	001 152 2436 3
R104	ERDS2TJ153	001 152 2351 7
R105	ERDS2TJ182	001 152 2352 6
R106	ERDS2TJ473	001 152 2363 3
R107	ERDS2TJ274	001 152 2437 2
R108	ERDS2TJ101	001 152 2421 0
R109, R110	ER0S2TKF4702	001 151 5723 2
R111, R112	ERDS2TJ274	001 152 2437 2
R113, R114	ER0S2TKF4702	001 151 5723 2
R115	ERDS2TJ102	001 152 2346 4
R116	ERDS2TJ472	001 152 2362 4
R117	ERDS2TJ270	001 152 2434 5
R118	ERDS2TJ3R3	001 152 3152 8
R119	ERDS2TJ101	001 152 2421 0
R120	ERDS2TJ270	001 152 2434 5
R121	ERDS2TJ3R3	001 152 3152 8
R122	ERDS2TJ153	001 152 2351 7
R123	ERDS2TJ101	001 152 2421 0
R124	ERDS2TJ103	001 152 2347 3
R125	ERDS2TJ104	001 152 2348 2
R126	ERDS2TJ152	001 152 2350 8
R127	ERDS2TJ682	001 152 2365 1
R128	ERDS2TJ153	001 152 2351 7
R129	ERDS2TJ224	001 152 2433 6
R130	ERDS2TJ122	001 152 2423 8
R131, R132	ERDS2TJ333	001 152 2358 0
R133	ERDS2TJ102	001 152 2346 4
R134	ERDS2TJ392	001 152 2439 0
R135	ERDS2TJ102	001 152 2346 4
R136	ERDS2TJ182	001 152 2352 6
R137	ERDS2TJ681	001 152 2449 8
R138	ERDS2TJ333	001 152 2358 0
R139	ERDS2TJ222	001 152 2353 5
R140	ERDS2TJ223	001 152 2432 7
R141	ERDS2TJ153	001 152 2351 7
R142	ERDS2TJ821	001 152 2454 1
R143	ERDS2TJ474	001 152 2443 4
R144	ERDS2TJ471	001 152 2361 5
R145	ERDS2TJ270	001 152 2434 5
R171	ERDS2TJ154	001 152 2427 4
R172, R173	ERDS2TJ472	001 152 2362 4
R174	ERDS2TJ223	001 152 2432 7
R175	ERDS2TJ334	001 152 2438 1
R176	ERDS2TJ473	001 152 2363 3
R177	ERDS2TJ683	001 152 2450 5
R178	ERDS2TJ332	001 152 2357 1
R179	ERDS2TJ822	001 152 2455 0
R180, R181	ERDS2TJ682	001 152 2365 1
R182	ERDS2TJ822	001 152 2455 0
R183, R184	ERDS2TJ152	001 152 2350 8
R185	ERDS2TJ102	001 152 2346 4
R186, R187	ERDS2TJ182	001 152 2352 6
R188	ERDS2TJ102	001 152 2346 4
R189	ERDS2TJ471	001 152 2361 5
R190	ERDS2TJ120	001 152 3146 6
R301	ERDS2TJ682	001 152 2365 1
R302	ERDS2TJ104	001 152 2348 2
R303	ERDS2TJ334	001 152 2438 1
R304, R305	ERDS2TJ223	001 152 2432 7
R306	ERDS2TJ102	001 152 2346 4
R307	ERDS2TJ472	001 152 2362 4
R308	ERDS2TJ471	001 152 2361 5
R309	ERDS2TJ121	001 152 2349 1
R401, R402	ERDS2TJ472	001 152 2362 4
R403, R404	ERDS2TJ473	001 152 2363 3
R405	ERDS2TJ152	001 152 2350 8
R406, R407	ERDS2TJ103	001 152 2347 3
R408, R409	ERDS2TJ103	001 152 2347 3
R410, R411	ERDS2TJ472	001 152 2362 4
R412, R413	ERDS2TJ472	001 152 2362 4
R414, R415	ERDS2TJ472	001 152 2362 4
R416	ERDS2TJ223	001 152 2432 7
R417, R418	ERDS2TJ472	001 152 2362 4
R420	ERDS2TJ473	001 152 2363 3
R421	ERDS2TJ331	001 152 2356 2
R422	ERDS2TJ394	001 152 2441 6
R501, R502	ERJ8GEXK1R0	
R503	ERJ8GEYJ223	001 151 5630 6
R601, R602	ERDS2TJ222	001 152 2353 5
R603, R604	ERDS2TJ222	001 152 2353 5
R801, R802	ER0S2TKG1101	001 151 3323 2
R803, R804	ER0S2TKG1201	001 151 3324 1
R805, R806	ER0S2TKG33R0	001 151 4828 8
R807, R808	ER0S2TKG10R0	001 151 4827 9
R809, R810	ER0S2TKG1001	001 151 3320 5
R811, R812	ER0S2TKG3301	001 151 3338 5
R813, R814	ER0S2TKG33R0	001 151 4828 8
R815, R816	ER0S2TKG10R0	001 151 4827 9
R817, R818	ER0S2TKG1001	001 151 3320 5
R819, R820	ER0S2TKG3301	001 151 3338 5
R821, R822	ERDS2TJ391	001 152 2360 6
R823, R824	ERDS2TJ104	001 152 2348 2
R825, R826	ERDS2TJ222	001 152 2353 5
R827, R828	ERDS2TJ221	001 152 2431 8
R831	ERDS2TJ272	001 152 2354 4
R832	ERDS2TJ103	001 152 2347 3
R833	ER0S2TKG33R0	001 151 4828 8
R834	ER0S2TKG10R0	001 151 4827 9
R835	ER0S2TKG1001	001 151 3320 5
R836	ER0S2TKG3301	001 151 3338 5
R837, R838	ERDS2TJ104	001 152 2348 2
R839, R840	ERDS2TJ103	001 152 2347 3
R841	ERDS2TJ103	001 152 2347 3
R843, R844	ERDS2TJ101	001 152 2421 0
R845, R846	ERDS2TJ102	001 152 2346 4
R851, R852	ERDS2TJ103	001 152 2347 3
R853, R854	ERDS2TJ473	001 152 2363 3
R855, R856	ERDS2TJ820	001 152 2453 2
R857, R858	ERDS2TJ103	001 152 2347 3
CAPACITORS		
C1, C2 ⚠	ECKD1H223PF	001 103 1510 9
C3 ⚠	ECKD1H223PF	001 103 1510 9
C4, C5	REC1E102M1	001 120 5156 4
C6, C7	ARA1H010M0T	001 120 5694 3
C8 ⚠	ECKD1H223PF	001 103 1510 9
C11, C12	ECEA1CU222	001 120 3074 3
C13, C14	ECEA0JS221	001 120 2925 9
C15	ECEA1EU470	001 120 2841 2
C18	ECEA1HU470	001 120 3257 8
C19, C20	ECEA1CU470	001 120 2835 0
C21	ECFR1E104ZF	001 103 5089 5
C101	ECQM1H104JZ	001 106 0675 8

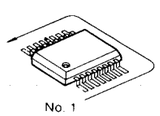
Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code
C102	ECEA1CU100	001 120 2905 3	C139	ECEA1CN220BV		C404	ECFD1H104ZF	001 108 0906 2
C103	ECEA1HN2R2S	001 120 0356 8	C140	ECKD1H681K	001 103 1580 5	C405	ECQM1H103JZ	001 106 0667 8
C104	ECQM1H103JZ	001 106 0667 8	C141	ECFF1H103KR		C406	ECEA1HUR22	001 120 3247 0
C105	ECQM1H224KVW	001 106 5164 6	C142, C143	ECKD1H101KB	001 103 1412 0	C407	ECFD1H104ZF	001 108 0906 2
C106	ECEA1CU100	001 120 2905 3	C144	ECKR1H222KB		C408	ECKD1H102KB	001 103 1414 8
C107, C108	ECEA1HNR22BV		C145	ECEA1AU220	001 120 3563 1	C501	ECEV1EV330	001 120 5624 7
C109	ECEA1HN2R2S	001 120 0356 8	C146	ECEA0JU470	001 120 3125 9	C502	ECEV1HV010	001 120 5625 6
C110	ECQM1H122JZ	001 106 0683 8	C147, C148	ECKD1H102KB	001 103 1414 8	C504	GR426B273K25	001 103 7125 0
C111	ECQM1H473JZ	001 106 0810 9	C149	ECQM1H153JZ	001 106 0704 0	C506	GR426B152K50	001 120 5626 5
C112	ECFR1E104ZF	001 103 5089 5	C150	ECQM1H102JZ	001 106 0661 4	C507	GR426F104Z25	001 103 7127 8
C113	ECQM1H153JZ	001 106 0704 0	C151	ECQM1H153JZ	001 106 0704 0	C511, C512	ECEA1EN470S	001 120 2394 4
C114	ECEA1HN3R3S	001 120 0358 6	C152, C153	ECQM1H104JZ	001 106 0675 8	C513	ECEA1EN470S	001 120 2394 4
C115	ECFR1E104ZF	001 103 5089 5	C154	ECKD1H471KB	001 103 1551 0	C601	RCBS1C103MYY	001 103 8060 6
C119	ECEA0JU101	001 120 2829 8	C155	ECKD1H103PF	001 103 1449 7	C602	RCBS1H220JCY	001 103 5600 2
C120	RCBS1C103MYY	001 103 8060 6	C156	ECKD1H681K	001 103 1580 5	C803, C804	CQS2B391JCF	001 106 4821 0
C121	ECFR1E104ZF	001 103 5089 5	C301	ECEA1HN2R2S	001 120 0356 8	C805, C806	CQS2B103JCD	001 106 5208 1
C122, C123	ECKD1H102KB	001 103 1414 8	C302	ECFF1H103KR		C807, C808	ARA1CN220M0T	001 120 5013 8
C124	ECKD1H681K	001 103 1580 5	C303, C304	ECQM1H104JZ	001 106 0675 8	C809, C810	ECKD1H102KB	001 103 1414 8
C127	ECCC1H220K	001 103 0493 7	C305	ECCC1H220K	001 103 0493 7	C811, C812	ECEA0JU470	001 120 3125 9
C128	ECEA1HS0R1	001 120 3250 5	C306	ECCD1H070CC	001 103 0271 9	C813, C814	ARA1C221M0	001 120 5664 9
C129	ECEA1HU010	001 120 2842 1	C307	ECFR1E104ZF	001 103 5089 5	C815, C816	ECEA1CN220BV	
C130	ECQV1H104JZ	001 106 2571 7	C308	ECKD1H471KB	001 103 1551 0	C817	ECEA0JS221	001 120 2925 9
C131, C132	ECEA1HU100	001 120 3251 4	C309	ECQV1H104JZ	001 106 2571 7	C818	ECKD1H471KB	001 103 1551 0
C133	ECEA1HNR33BV		C310	ECCD1H070CC	001 103 0271 9	C851, C852	ECKD1H103PF	001 103 1449 7
C134	ECKD1H182KB	001 103 1479 1	C311, C312	ECCD1H470K	001 103 0627 1	C853, C854	ECKD1H332KB	001 103 1531 4
C135	ECKD1H682KB	001 103 1592 1	C313, C314	ECCD1H470K	001 103 0627 1	C857, C858	ECEA1CU100	001 120 2905 3
C136	ECQM1H333JZ	001 106 0779 1	C401	ECEA0JU470	001 120 3125 9	C859, C860	ECKD1H223PF	001 103 1510 9
C137	ECKD1H221KB	001 103 1487 1	C402	ECFR1E104ZF	001 103 5089 5	C901 ⚠	ECKDKC103PF2	001 103 3734 7
C138	ECEA1HU010	001 120 2842 1	C403	ECKD1H103PF	001 103 1449 7			

• Terminal guide of IC's, transistors and diodes

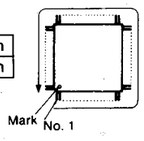
AN6552F	8 Pin
SVIM5218P	
SVIM5238P	
AN6554	14 Pin
MN4053B	16 Pin
MN6030	22 Pin
SVIPCM54KP	28 Pin
MN15283PDP	64 Pin



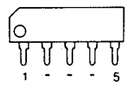
MN1550PDM	18 Pin
MN4416S−12	24 Pin
AN8290S	
AN8370S	42 Pin



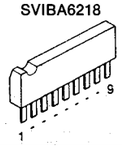
MN6618A	42 Pin
MN6617	84 Pin



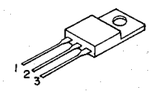
SVIM51953BL



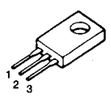
SVIBA6218



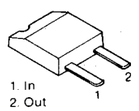
AN78M12, AN79M12
AN78M05



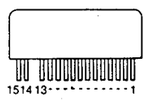
AN79N05



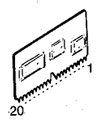
SVIFU15



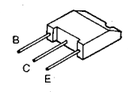
EHDGA1243



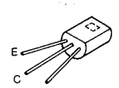
SVIAL175



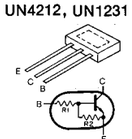
2SD973, 2SB793



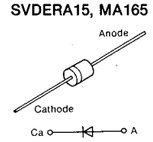
2SA1309



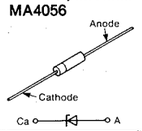
UN4212, UN1231



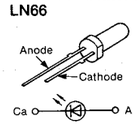
SVDERA15, MA165



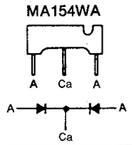
MA4082, MA4330
MA4056



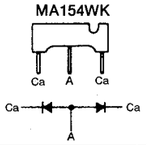
SVDSLR−54MW4
LN66



MA154WA



MA154WK



■ REPLACEMENT PARTS LIST

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.
* "Ⓢ" mark parts are used for silver type only.
* "Ⓚ" mark parts are used for black type only.
Parts other than "Ⓢ" and "Ⓚ" marked are used for both silver and black types.

Ref. No.	Part No.	Part Code	Description
INTEGRATED CIRCUITS			
IC1	AN78M12	001 060 4333 2	I.C.
IC2	AN79M12	001 060 8254 4	I.C.
IC4, IC5	SVIFU15	001 060 8433 3	I.C.PROTECTOR
IC11	AN78M05	001 060 4137 4	I.C.
IC12	AN79N05	001 060 8714 7	I.C.
IC101	AN8370S	001 060 8399 8	I.C.
IC102, IC103	AN6554	001 060 4331 4	I.C.
IC106	MN4053B	001 060 7141 6	I.C.
IC301	MN6617	001 060 8411 9	I.C.
IC302	MN6618A	001 061 3043 8	I.C.
IC303	MN4416S-12	001 060 9746 5	I.C.
IC304	EHDGA1243	001 061 3036 7	I.C.
IC401	MN15283PDP		I.C.
IC402	SVIM51953BL	001 061 1423 8	I.C.
IC403	SVIBA6218	001 061 1421 0	I.C.
IC501	AN8290S	001 061 3034 9	I.C.
IC601	MN1550PDM	001 061 3230 7	I.C.
IC602	SVIHC-MD01E	001 061 3096 5	I.C.
(E, EK, XL, EG)			
(EB, EH, EF)			
(EI, XA, XB)			
(PA, PE, PC)			
IC602	SVIHC-MD03M	001 061 3097 4	I.C.
(M, MC)			
IC801, IC802	SVIAL175		I.C.
IC803, IC804	SVIM5238P	001 060 9725 0	I.C.
IC805	SVIM5238P	001 060 9725 0	I.C.
IC806	AN6552F	001 060 0274 2	I.C.
IC807	SVIPCM54KP	001 060 9726 9	I.C.
IC808	SVIM5238P	001 060 9725 0	I.C.
IC851	SVIM5218P	001 060 8796 9	I.C.
TRANSISTORS			
Q11	2SD973	001 030 1944 1	TRANSISTOR
Q12	2SB793-QRS	001 030 2766 7	TRANSISTOR
Q13	2SA1309	001 030 4058 0	TRANSISTOR
Q101	2SD973	001 030 1944 1	TRANSISTOR
Q102	2SB793-QRS	001 030 2766 7	TRANSISTOR
Q103	2SD973	001 030 1944 1	TRANSISTOR
Q104	2SB793-QRS	001 030 2766 7	TRANSISTOR
Q105	2SD973	001 030 1944 1	TRANSISTOR
Q106	2SB793-QRS	001 030 2766 7	TRANSISTOR
Q110	2SD637	001 030 1794 7	TRANSISTOR
Q408, Q409	UN4212	001 030 3019 1	TRANSISTOR
Q411, Q412	UN4212	001 030 3019 1	TRANSISTOR
Q413, Q415	UN4212	001 030 3019 1	TRANSISTOR
Q416	UN4212	001 030 3019 1	TRANSISTOR
Q801, Q802	2SA1309	001 030 4058 0	TRANSISTOR
DIODES			
D1, D2 ⚠	SVDERA15-04T	001 032 9312 5	RECTIFIER
D3, D4 ⚠	SVDERA15-04T	001 032 9312 5	RECTIFIER
D5, D6 ⚠	SVDERA15-04T	001 032 9312 5	RECTIFIER
D7, D8 ⚠	SVDERA15-04T	001 032 9312 5	RECTIFIER
D9 ⚠	SVDERA15-04T	001 032 9312 5	RECTIFIER
D11, D12	MA4082M	001 032 4955 6	DIODE
D13	MA4330L	001 032 7228 8	DIODE
D14 ⚠	MA4082M	001 032 4955 6	DIODE
D101, D102	MA165	001 032 0494 0	DIODE
D103, D401	MA165	001 032 0494 0	DIODE
D417, D418	MA165	001 032 0494 0	DIODE
D501	MA153	001 032 0489 7	DIODE

Ref. No.	Part No.	Part Code	Description
D601, D602	MA165	001 032 0494 0	DIODE
D603, D604	MA165	001 032 0494 0	DIODE
D605, D606	MA165	001 032 0494 0	DIODE
D607, D608	MA165	001 032 0494 0	DIODE
D609, D610	MA165	001 032 0494 0	DIODE
D611, D612	MA165	001 032 0494 0	DIODE
D613, D614	MA165	001 032 0494 0	DIODE
D615	MA165	001 032 0494 0	DIODE
D641, D642	SVDSLR-54MW4	001 032 8364 7	LED
D643	SVDSLR-54MW4	001 032 8364 7	LED
D801, D802	MA4056-M	001 032 7209 1	DIODE
D803, D804	MA165	001 032 0494 0	DIODE
D805	MA165	001 032 0494 0	DIODE
HALL ELEMENTS			
H501, H502	0H-001	001 036 0010 2	HALL ELEMENT
VARIABLE RESISTORS			
VR101	EVND3AA00B53	001 180 2644 9	5KΩ(B)
VR102, VR103	EVND3AA00B14	001 180 2642 1	10KΩ(B)
VR104, VR105	EVND3AA00B14	001 180 2642 1	10KΩ(B)
VR106	EVND3AA00B53	001 180 2644 9	5KΩ(B)
VR301	EVN38CA00B13	001 180 0549 5	1KΩ(B)
VR601	EVQWX3F2025B		200KΩ (B)
VR851	EVUN1AF15A15		100KΩ (A)
COILS AND TRANSFORMERS			
L301, L302	ELEPH2R7MA		COIL
L303	ELEPH2R7MA		COIL
L501	NL4532T100K2	001 211 3218 9	COIL
L304, L305	ELEPH2R7MA		COIL
L851, L852	ELEPG1R2MA	001 210 7215 1	COIL
T1 ⚠ (M, MC)	SLTD1133U-1		POWER TRANSFORMER
T1 ⚠ (XL)	SLTD54JE49E		POWER TRANSFORMER
T1 ⚠ (EK, XA, XB) (PA, PE, PC)	SLTD54JE50E		POWER TRANSFORMER
T1 ⚠ (E, EG, EB, EH) (EF, EI)	SLTD54JS48E1		POWER TRANSFORMER
OSCILLATORS			
X301	SVQ16CKSS	001 250 1471 7	16.9344MHZ
DISPLAYS			
FL601	SADD5		DISPLAY
FUSES			
F1 ⚠ (E, EK, XL, EG) (EB, EH, EF) (EI, XA, XB) (PA, PE, PC)	XBA2C008TB0S		250V, T80mA
F2 ⚠ (EK, XA, XB) (PA, PE, PC)	XBA2C016TB0S	002 380 1470 5	250V, T160mA
SWITCHES			
S1 ⚠	ESB8249V	003 435 5877 0	POWER
S2 ⚠ (EK, XA, XB) (PA, PE, PC)	SRDSHXW0251	003 438 1067 7	VOLTAGE SELECTOR
S101	SSPD5	003 434 1032 8	REST
S601, S628	EVQQS405K	003 435 2832 5	OPERATION
RELAYS			
RL801, RL802	SSYD3		RELAY

Ref. No.		Part No.	Part Code	Description
CABINET AND CHASSIS				
1	Ⓚ	SKCLP720-KM	016 800 2985 1	TOP COVER ASS'Y
1	Ⓢ	SKCLP720-SE	016 800 2986 0	TOP COVER ASS'Y
2	Ⓚ	SGWLP720-KM	016 840 7371 1	FRONT PANEL ASS'Y
2	Ⓢ	SGWLP720-SE	016 840 7408 5	FRONT PANEL ASS'Y
8	Ⓢ	SBN1161	016 700 0471 7	KNOB
8	Ⓚ	SBN1161-2	016 700 1849 9	KNOB
9	Ⓚ	SGYLP720-KM	016 840 7349 9	FRAME ASS'Y
9	Ⓢ	SGYLP720-SE	016 840 7402 1	FRAME ASS'Y
9-1		SGUD149A	016 842 1552 2	PANEL
9-2		SDUD16A	016 842 1553 1	FILTER
9-3	Ⓢ	SGXD2301MA	016 846 3669 2	COVER, BUTTON
9-3	Ⓚ	SGXD2301ZC	016 846 3668 3	COVER, BUTTON
9-4	Ⓚ	SBCD3850MW1A	016 702 6879 3	BUTTON
9-4	Ⓢ	SBCD3850MZ1A	016 702 6880 0	BUTTON
10		SDUD17	016 862 1073 0	PANEL
12	Ⓢ	SBCD3861MA	016 702 6890 8	BUTTON
12	Ⓚ	SBCD3861ZC	016 702 6891 7	BUTTON
13		SUSD57	016 726 0906 9	SPRING
14	Ⓢ	SBCD3810MA	016 702 6872 0	BUTTON
14	Ⓚ	SBCD3810ZK	016 702 6871 1	BUTTON
15	Ⓢ	SBCD3830MA	016 702 6873 9	BUTTON
15	Ⓚ	SBCD3830ZK	016 702 6874 8	BUTTON
16	Ⓚ	SBND30MW	016 700 1943 2	KNOB ASS'Y
16	Ⓢ	SBND30MZ	016 700 1944 1	KNOB ASS'Y
16-1		SHR9451	016 652 0151 7	SPACER
17	⚠	SJSD16	003 400 7436 6	AC SOCKET
(XL)				
17	⚠	SJS9236	003 403 4660 7	AC SOCKET
(M, MC, E, EK)				
(EG, EB, EH)				
(EF, EI, XA)				
(XB, PA, PE)				
(PC)				
18	Ⓢ	SBC666	016 702 5545 6	BUTTON
18	Ⓚ	SBC666-5	016 702 6679 9	BUTTON
19		SUBD3-2	016 712 0346 5	ROD
20		SHGD95-1	016 653 1136 7	CUSHION RUBBER
21		SHGD65	016 653 1134 9	RUBBER
22		SHGD66	016 653 1135 8	RUBBER
23		SUSD65	016 726 0903 2	SPRING (YELLOW)
24		SUSD42	016 726 0841 9	SPRING (SILVER)
25		SUSD66	016 726 0904 1	SPRING (WITH BLUE MARK)
26		SHE185	016 918 0330 9	SPACER
27		SKL306	016 828 0318 6	INSULATER
29		SGPD611KY2A	016 840 7353 3	CHASSIS
(M)				
29		SGPD611KY3A	016 840 7352 4	CHASSIS
(XA)				
29		SGPLP720-KE	016 840 7356 0	CHASSIS
(E)				
29		SGPLP720-KEB	016 840 7361 3	CHASSIS
(EB, EH.EF)				
(EI)				
29		SGPLP720-KEG	016 840 7360 4	CHASSIS
(EG)				
29		SGPLP720-KEK	016 840 7358 8	CHASSIS
(EK)				
29		SGPLP720-KMC		CHASSIS
(MC)				
29		SGPLP720-KPA	016 840 7362 2	CHASSIS
(PA, PE, PC)				
29		SGPLP720-KXB	016 840 7363 1	CHASSIS
(XB)				
29		SGPLP720-KXL	016 840 7359 7	CHASSIS
(XL)				
30		SKUD120ZK	016 802 2119 5	BOTTOM BOARD
31		SJFD4-1	003 410 7879 7	TERMINAL PLATE
32		SJS6805	003 400 1689 1	SOCKET (8 PIN)
34		SJJ134B	003 400 7050 0	JACK, HEADPHONES
CONNECTORS				
41, 42		SJSD0905	003 403 4153 1	CONNECTOR (CN405, 404)
43, 44		SJSD0905	003 403 4153 1	CONNECTOR (CN403, 402)
45		SJSD0905	003 403 4153 1	CONNECTOR (CN401)
46		SJSD1709	003 403 6503 1	CONNECTOR (CN101)
47		EMCS0350Z	003 402 1227 7	CONNECTOR (CN104)
48		EMCS0850Z		CONNECTOR (CN1)
49		EMCS0550Z	003 402 1233 9	CONNECTOR (CN801)
50		SJTD713-R		CONNECTOR (CN302)
51		SRDJ001N14E	003 410 6157 8	SHORTING PIN (CN102)
52		EMCS0550Z	003 402 1233 9	CONNECTOR (CN407)
53		EMCS0552M	003 402 0112 1	CONNECTOR (CN102)
SCREWS, WASHERS AND NUTS				
N1		XTV3+8JFZ	005 501 0919 2	SCREW
N2		SHDD1-3		SCREW
N3		XTV3+8JFN	005 501 1326 7	SCREW
N4		XTV3+8J	005 501 0901 2	SCREW
N5	Ⓢ	SRXG007N10	005 500 5434 3	SCREW
N5	Ⓚ	SRXG007N51	005 500 5012 1	SCREW
N6		XTBS3+8JFZ1	005 501 2523 0	SCREW
N7		XTV3+20JFYR		SCREW
N8		XTV3+14JFYR	005 501 2610 2	SCREW
N9		XTW3+12TFZ		SCREW
N10		XTW3+8TFZ	005 501 2926 5	SCREW
N11		SNE4021	005 507 0372 5	NUT
N12		SHDD1-4	016 652 0709 1	SCREW
N13		XTV3+8JFZ	005 501 0919 2	SCREW
(EK, XA, XB)				
(PA, PE, PC)				

Ref. No.		Part No.	Part Code	Description
LOADING MECHANICAL				
1		SIRLP720-KM	016 652 0715 3	TRAY ASS'Y
1-1		SHSD14	016 643 1002 6	SHEET
1-2		SHGD49	016 653 1079 9	RUBBER
3		SHGD92	016 653 1143 8	RUBBER
4	Ⓚ	SGXLP720-KM	016 846 3639 8	ORNAMENT ASS'Y
4	Ⓢ	SGXLP720-SE	016 846 3667 4	ORNAMENT ASS'Y
5		SUSD29-1	016 726 0845 5	SPRING
6		SIRD20-1	016 718 3365 0	LEVER
7		SIRD16E-1	016 631 0043 7	HOLDER ASS'Y
7-1		SHGD46	016 653 1080 6	RUBBER
9		SUWD46	016 650 5256 9	BRACKET
10		SUXD25	016 634 0124 2	SHAFT
11	⚠	S0ALP1200-KM	001 271 0692 3	OPTICAL PICKUP ASS'Y
12		EWSL04A00000	016 631 0044 6	HOLDER
13		SHGD47	016 653 1070 8	SPACER
14		S0RD10E	001 211 3219 8	COIL
15		EWS7B0A00Q53	001 174 8773 3	RESISTANCE UNIT
16		S0YD8E	016 634 0128 8	YOKE
17		S0YD9	016 634 0125 1	YOKE
18		SJGD4E	002 310 2308 2	MOTOR ASS'Y
19		SHGD64	016 653 1072 6	RUBBER
21		SDRD2	016 740 0117 8	PULLEY
22		SUWD44	016 650 5250 5	BRACKET
23		SHGD69	016 653 1078 0	RUBBER
26		SIRD17-1E	016 652 0711 7	CLAMPER
27		SIRD28-1	016 652 0712 6	HOLDER
28		SDGD19	016 745 0199 5	GEAR
29		SDGD20-1	016 745 0202 7	GEAR
31		SD0D8	005 512 0399 3	RING
32		SRQA010N04	017 726 0412 8	SPRING
33		SD0D7-1	016 766 0190 7	TURNTABLE ASS'Y
34		SISD7E-2	016 630 1787 5	BASE
39		SMBD2-1	016 754 0059 5	BELT
40		SHRD23	016 652 0633 4	LOCK SHAFT
41		S0MA9A	016 743 0060 3	ROTOR ASS'Y
42		SXPD830	003 483 1207 8	SPINDLE P.C.B
43		SHRD19-1	016 652 0710 8	LEVER
44		SUSD31	016 726 0843 7	SPRING
45		SUSD51	016 726 0846 4	SPRING
47		SUSD67-1	016 726 0911 2	SPRING
48		SUWD58	016 650 5322 6	PLATE
49		SUSD68	016 726 0910 3	SPRING
50		SGXD260ZK	016 846 3621 8	PLATE
SCREWS,WASHERS AND NUTS				
N1		SNSD10	005 500 5675 8	SCREW
N2		XTN2+4G	005 501 2780 5	SCREW
N3		XQN17+A6	005 500 4900 2	SCREW
N5		XTW3+8T	005 501 1358 9	SCREW
N6		XXE26D5	005 500 5095 2	SCREW
N7		SNSD9	016 726 0765 4	SCREW
N8		XSN26+6	005 500 1364 6	SCREW
N9		SFXW120-01	005 513 0957 0	WASHER
N10		XSN26+8	005 500 1368 2	SCREW
N11		XTN2+5G	005 501 3534 3	SCREW
N12		XTV3+6BFN	005 501 0888 2	SCREW
N13		XTV3+6GFZ	005 501 3160 3	SCREW
N14		XTV3+8G	005 501 0913 8	SCREW
N15		SFXGQ06N01	005 500 4983 3	SCREW
N18		XTV3+14G	005 501 0851 5	SCREW

Ref. No.		Part No.	Part Code	Description
INTEGRATED CIRCUITS				
IC1		MN6030B	001 060 6133 0	I.C.
(E, EK, XL, EG)				
(EB, EH, EF)				
(EI, XA, XB)				
(PA, PE, PC)				
IC1		MN6030CA	001 060 8758 5	I.C.
(M, MC)				
TRANSISTORS				
Q1		UN1231	001 030 5092 4	TRANSISTOR
DIODES				
D1		LN66-S	001 032 3730 5	LED
D2, D3		MA154WK	001 032 3491 1	DIODE
D4, D5		MA154WK	001 032 3491 1	DIODE
D6, D7		MA154WA	001 032 3490 2	DIODE
OSCILLATOR				
X1		CSB420PB1	001 030 0013 9	420 KHZ
(E, EK, XL, EG)				
(EB, EH, EF)				
(EI, XA, XB)				
(PA, PE, PC)				
X1		CSB455EB1T	001 250 1475 3	455KHZ
(M, MC)				
RESISTORS				
R1		ERDS2TJ1R0	001 152 2419 4	CARBON, 1/4W, 1Ω
CAPACITORS				
C1		ECKD1H101KB	001 103 1412 0	CERAMIC, 50V, 100PF
(M, MC)				
C1		ECKD1H471KB	001 103 1551 0	CERAMIC, 50V, 470PF
(E, EK, XL, EG)				
(EB, EH, EF)				
(EI, XA, XB)				
(PA, PE, PC)				
C2		ECKD1H101KB	001 103 1412 0	CERAMIC, 50V, 100PF
(M, MC)				
C2		ECKD1H121KB	001 103 1455 9	CERAMIC, 50V, 120PF
(E, EK, XL, EG)				
(EB, EH, EF)				
(EI, XA, XB)				
(PA, PE, PC)				
C3		ECEA0JK101	001 120 0136 8	ELECTROLYTIC, 6.3V, 100μF
REMOTE CONTROL TRANSMITTER				
1		UR64PP124C	016 840 6377 9	PANEL
2	Ⓚ	UR64CS119	016 640 0420 1	TOP COVER
2	Ⓢ	UR64CS119A	016 640 0436 3	TOP COVER
3		UR64SB125	016 861 2468 6	PLATE
4		UR64BT123A	016 702 6323 4	BUTTON
5		UR64CT122	016 653 1011 9	RUBBER, SWITCH
6	Ⓚ	UR64CS120	016 640 0419 4	BOTTOM COVER
6	Ⓢ	UR64CS120A	016 802 1864 3	BOTTOM COVER
7		UR64LB126AF	016 862 1000 7	LABEL
8	Ⓚ	UR64EC121	016 802 1716 4	COVER, BATTERY
8	Ⓢ	UR64EC121A	016 820 0513 5	COVER, BATTERY
9		UR64TD128	003 413 1408 3	TERMINAL ⊖
10		UR64TD127	003 413 1407 4	TERMINAL ⊕
11		UR52TD101	003 413 1406 5	TERMINAL
SCREWS,WASHERS AND NUTS				
N1	Ⓢ	XTS26+12GFC	005 501 3171 0	SCREW
N1	Ⓚ	XTS26+12GFZ	005 501 3122 9	SCREW

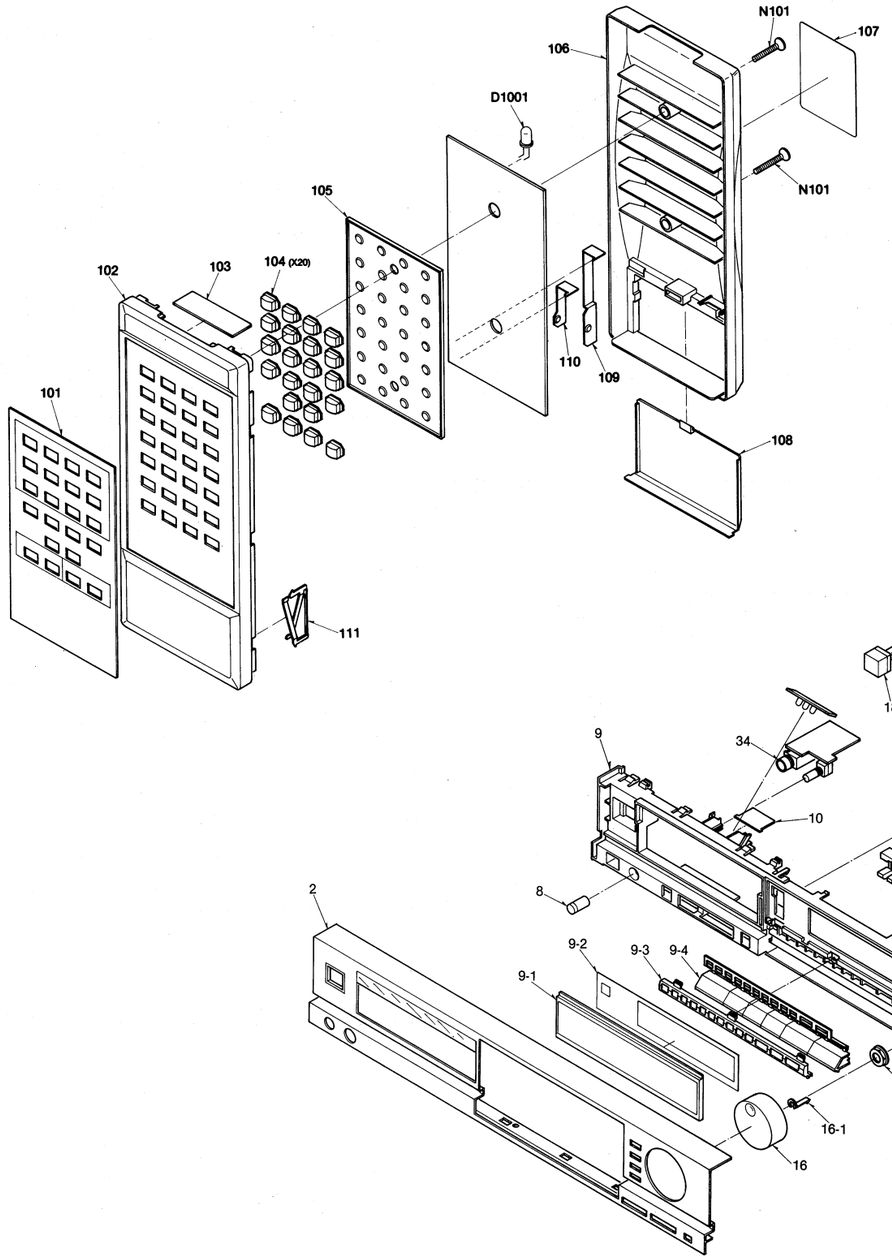
Ref. No.		Part No.	Part Code	Description
PACKINGS				
P1	Ⓚ	SPND123	016 971 4847 8	CARTON BOX
(M, E, EK, XL)				
(EG, EB, EH)				
(EI, XA, XB)				
(PA, PE, PC)				
P1	Ⓚ	SPND124	016 971 4862 9	CARTON BOX
(MC)				
P1	Ⓚ	SPND125	016 971 4858 5	CARTON BOX
(EF)				
P1	Ⓢ	SPND128	016 971 4860 1	CARTON BOX
(EF)				
P1	Ⓢ	SPND129	016 971 4861 0	CARTON BOX
(E, EK, XL, EG)				
(EB, EH, EI)				
(XA, XB, PA)				
(PE, PC)				
P2		SPSD85	016 971 4855 8	PAD
P3		SPSD86	016 971 4854 9	PAD
P4		SFYH60X50	016 978 0479 3	PROTECTION COVER
P5		SPSD68	016 977 3081 4	SHEET
P6		SRHZJ02N01	017 978 0097 5	PROTECTION COVER
P7		XZB23X20C03	016 978 0480 0	POLYETHYLENE BAG
ACCESSORIES				
A1		SQXLP720-KE	016 983 4950 4	INSTRUCTION BOOK
(E, EB, EH)				
A1		SQXLP720-KMC	016 983 4949 7	INSTRUCTION BOOK
(MC)				
A1		SQXLP720-KPA	016 983 4948 8	INSTRUCTION BOOK
(PA, PE, PC)				
A1		SQXLP720-KXB	016 983 4947 9	INSTRUCTION BOOK
(XB)				
A1		SQX54092	016 983 4946 0	INSTRUCTION BOOK
(M)				
A1		SQX54094	016 983 4945 1	INSTRUCTION BOOK
(XL, EF, XA)				
A1		SQX54096	016 983 4944 2	INSTRUCTION BOOK
(EK)				
A1		SQX54097	016 983 4943 3	INSTRUCTION BOOK
(EG)				
A1		SQX54098	016 983 4942 4	INSTRUCTION BOOK
(EI)				
A2	⚠	SFDAC05G02	003 490 2613 3	AC CORD
(EK)				
A2	⚠	SJA166	003 490 4157 8	AC CORD
(M, MC)				
A2	⚠	SJA168	003 490 4122 9	AC CORD
(PA, PE, PC)				
A2	⚠	SJA171	003 490 4160 3	AC CORD
(E, EG, EB, EH)				
(EF, EI, XA)				
A2	⚠	SJA173	003 490 4161 2	AC CORD
(XL)				
A2	⚠	SJA183	003 490 4873 7	AC CORD
(XB)				
A3		SFDHC05N01	003 492 5013 9	OUTPUT CORD
A4	⚠	RJP120ZBS-H	003 402 1437 9	PLUG
(XB, PA, PE)				
(PC)				
A5	⚠	SFDK-119118	003 402 0523 6	PLUG
(XA)				
A6		UM-3NE		BATTERY
(E, EK, XL, EG)				
(EB, EH, EF)				
(EI, XA, XB)				
(PA, PE, PC)				
A6		UM-3NEP		BATTERY
(M, MC)				

■ EXPLODED VIEW

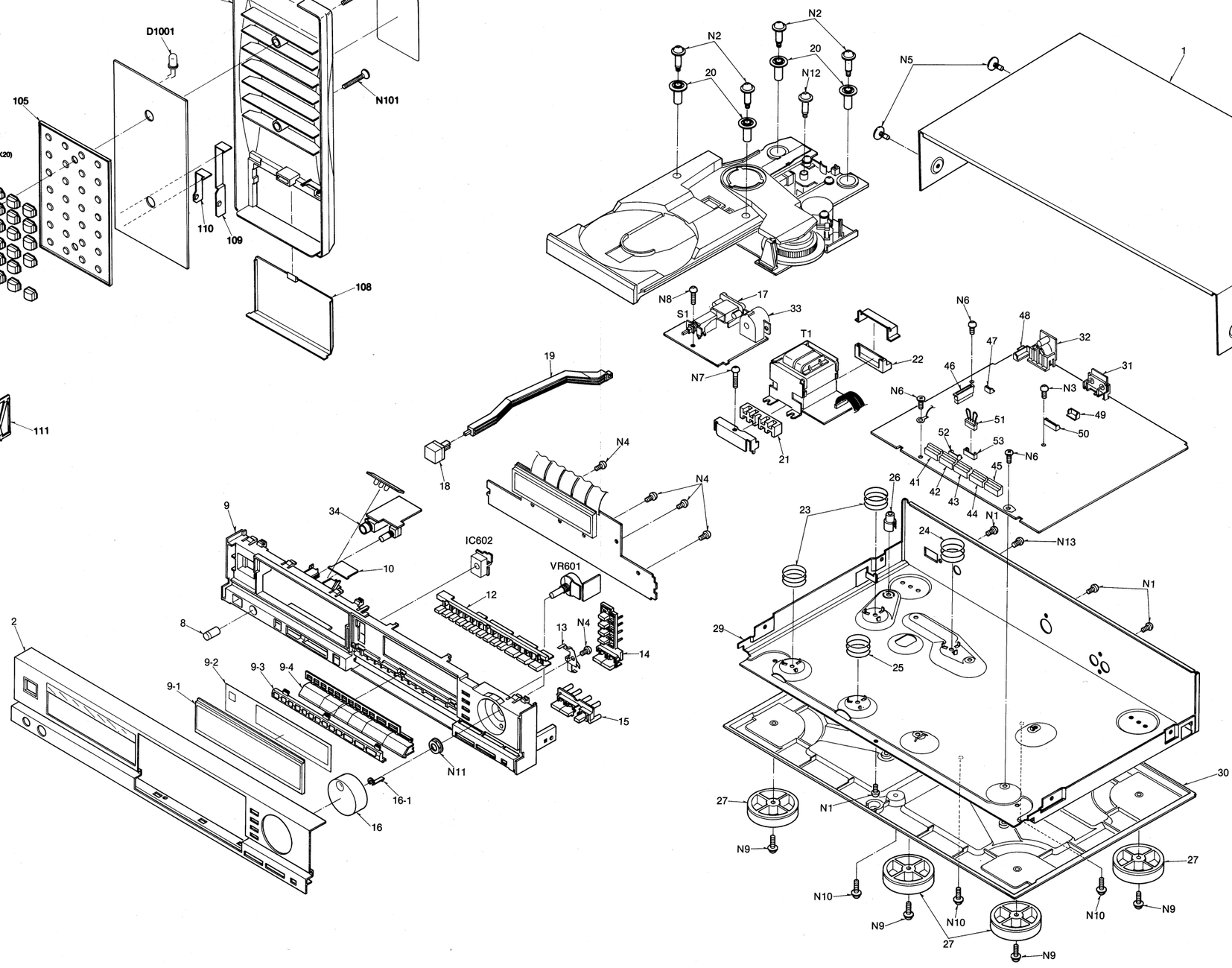
1 2 3 4 5 6 7 8 9 10

A B C D E F

• Remote control parts

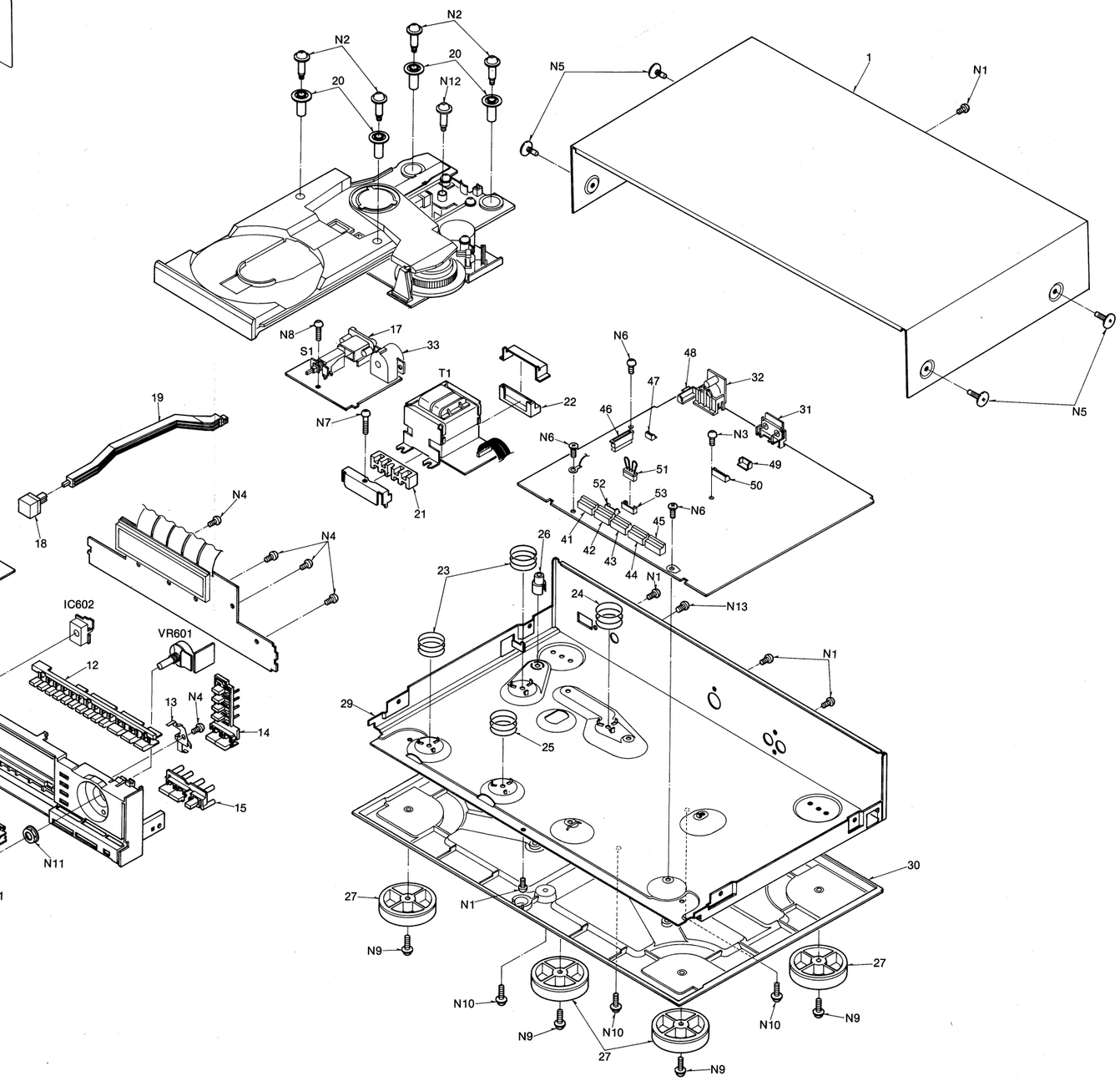


• Cabinet and chassis parts



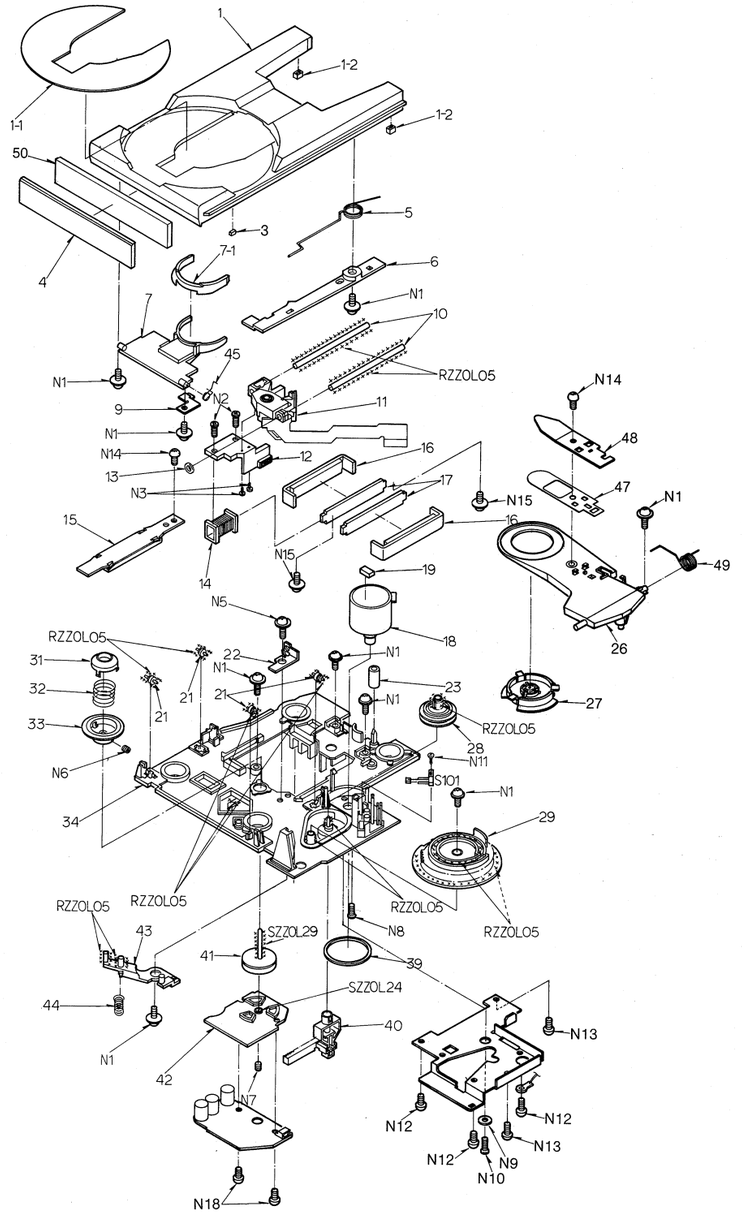
Note: When changing mechanism parts, apply the specified grease to the areas marked "× ×" shown in the drawing.

• Cabinet and chassis parts

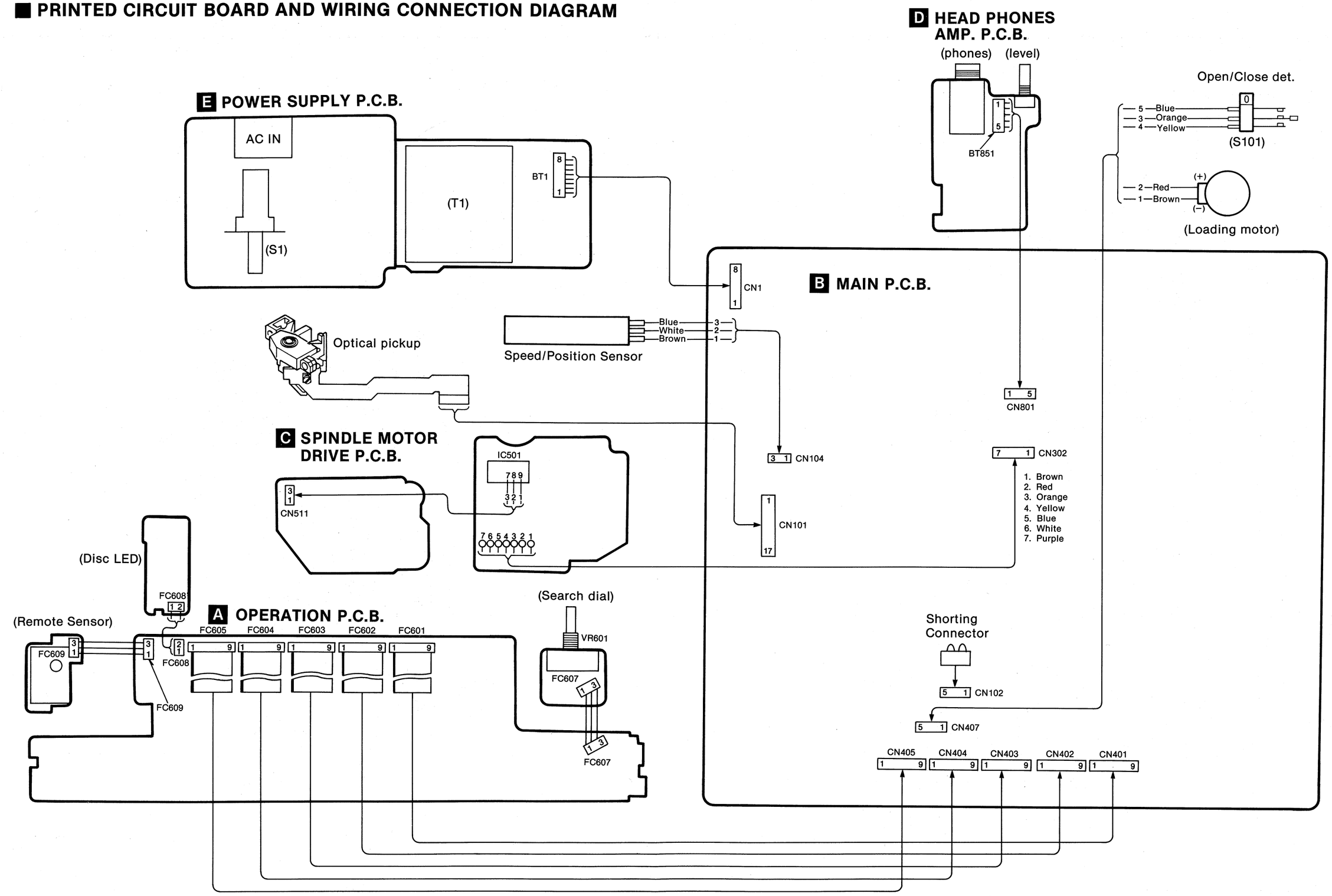


Note: When changing mechanism parts, apply the specified grease to the areas marked "× ×" shown in the drawing.

• Loading unit

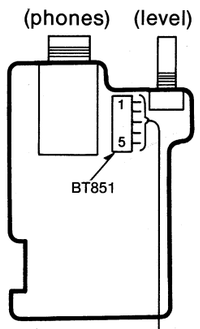


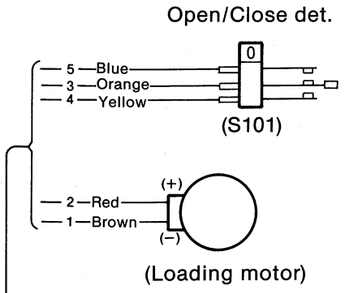
■ PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



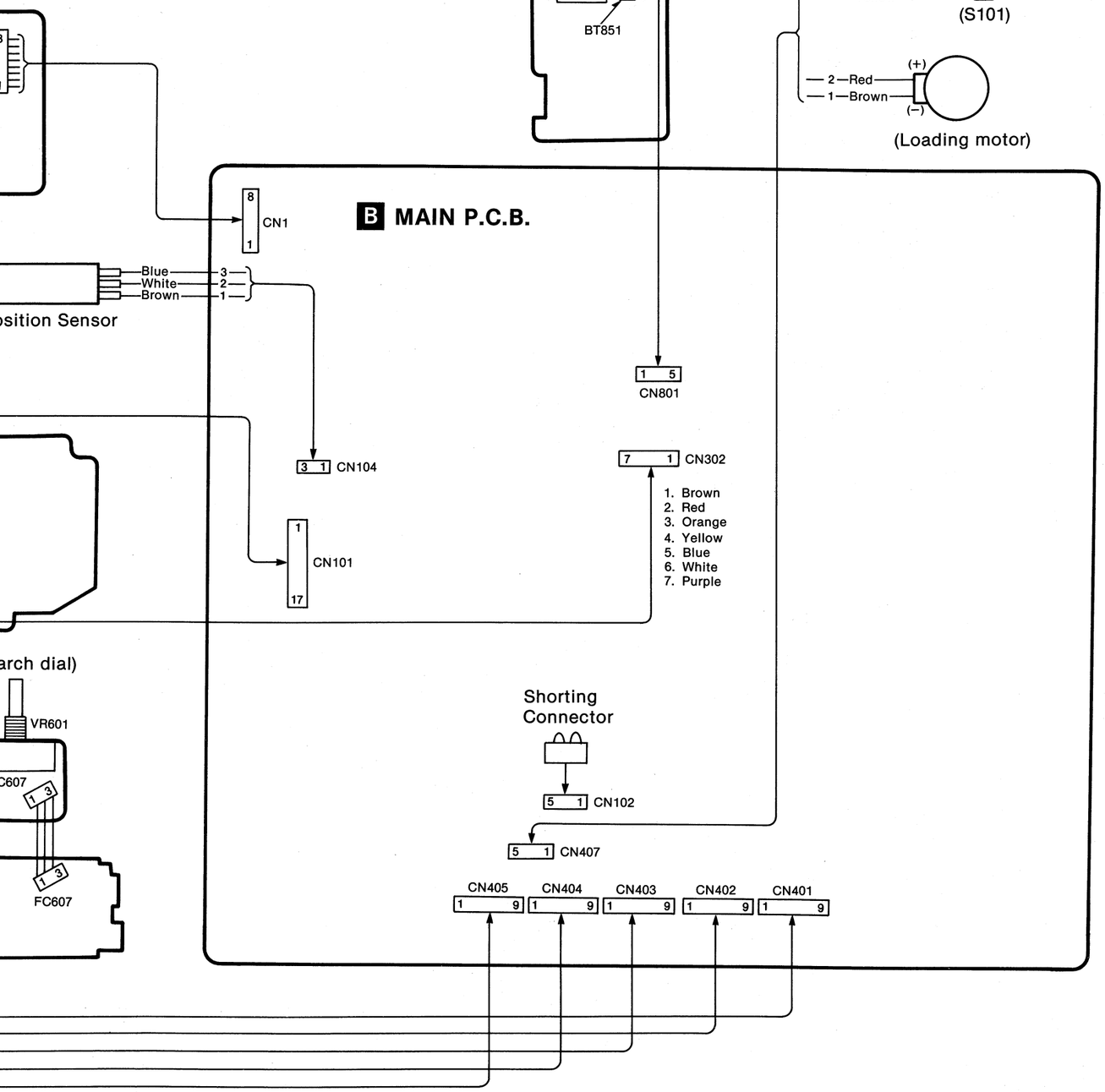
GRAM

D HEAD PHONES AMP. P.C.B.





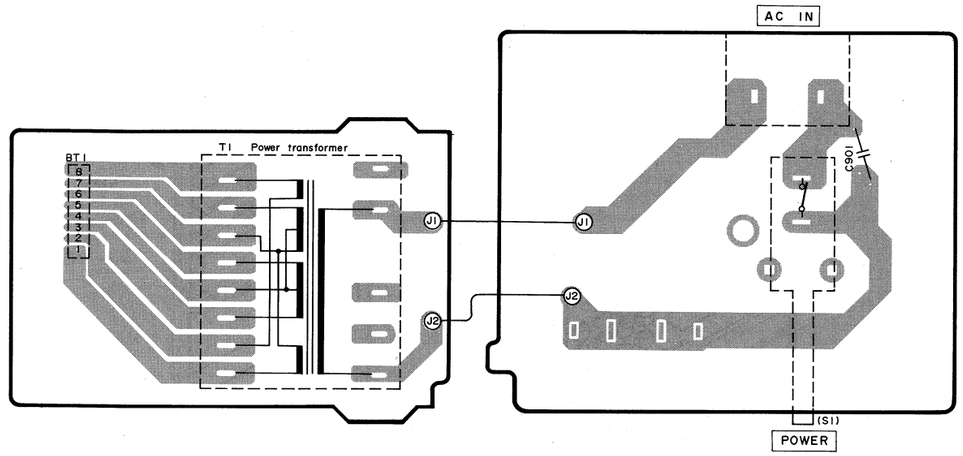
B MAIN P.C.B.



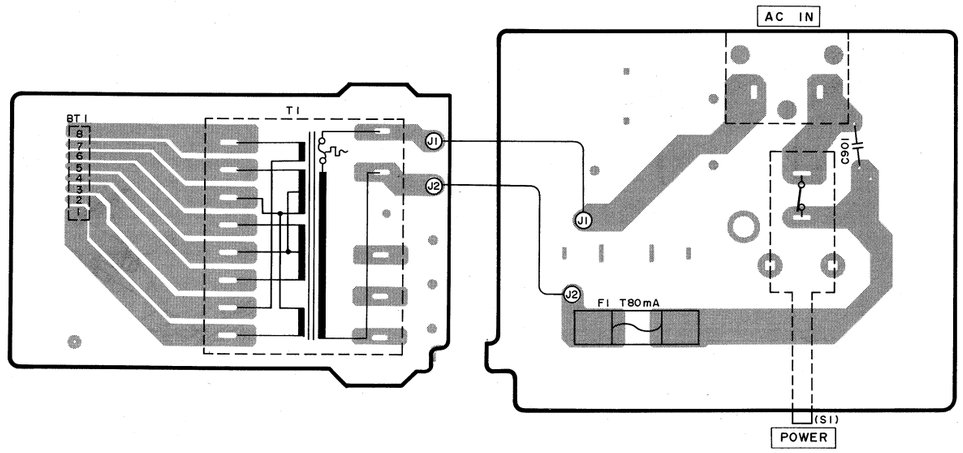
■ PRINTED CIRCUIT BOARDS

E POWER SUPPLY P.C.B.

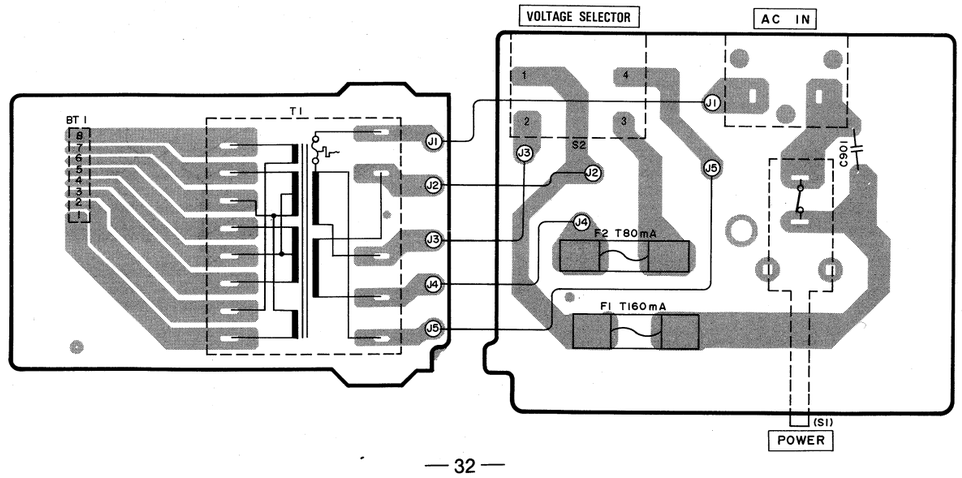
- **For U.S.A. and Canada**



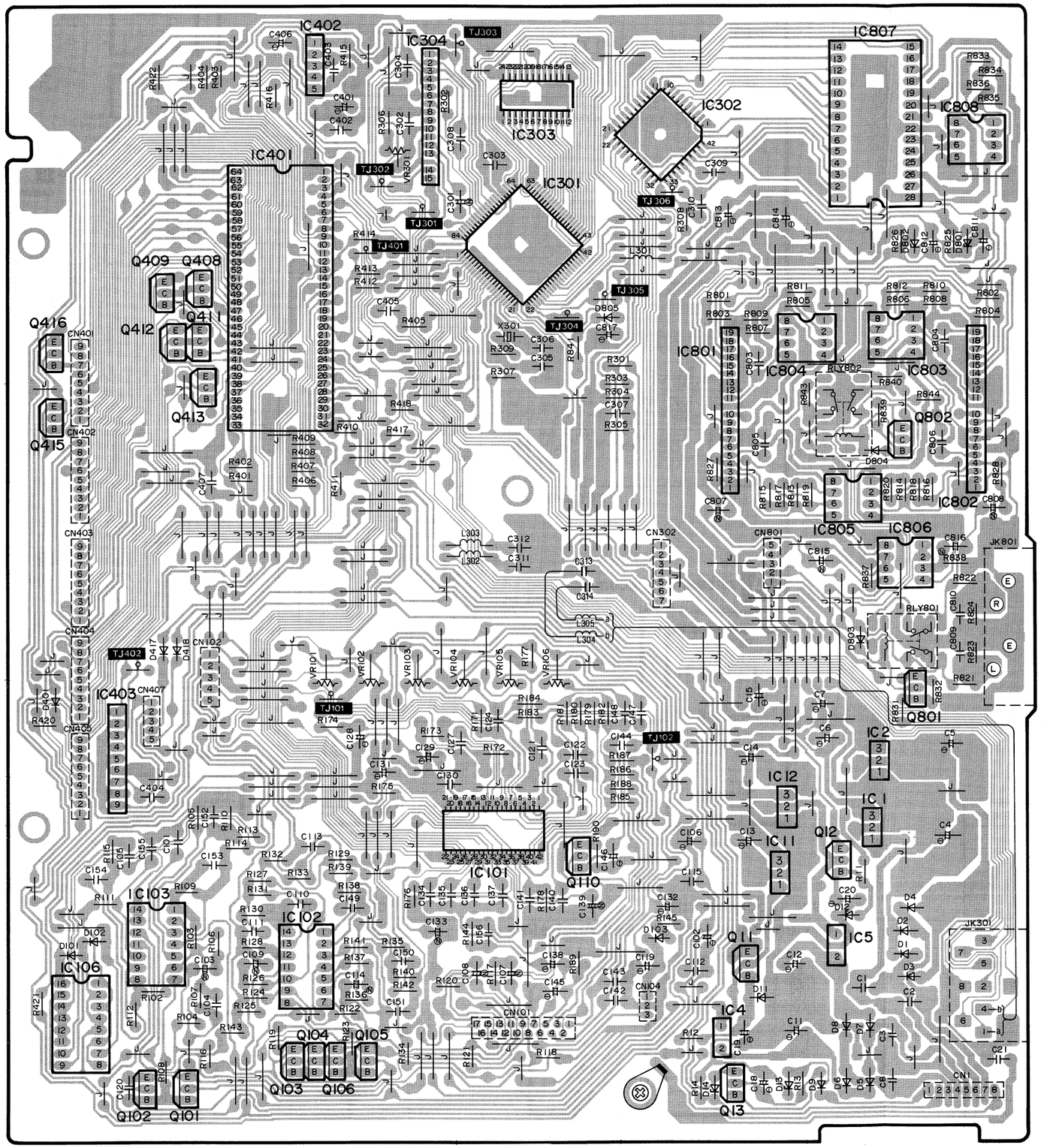
- **For Continental Europe and Australia**



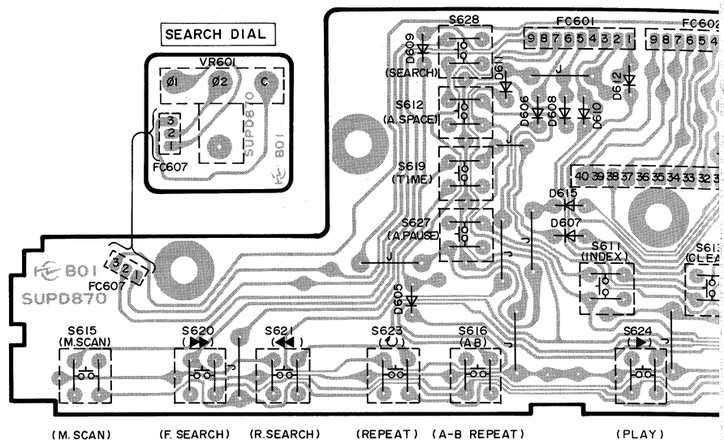
- **For Others**



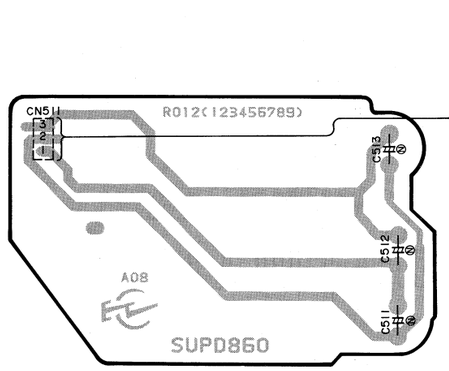
B MAIN P.C.B.



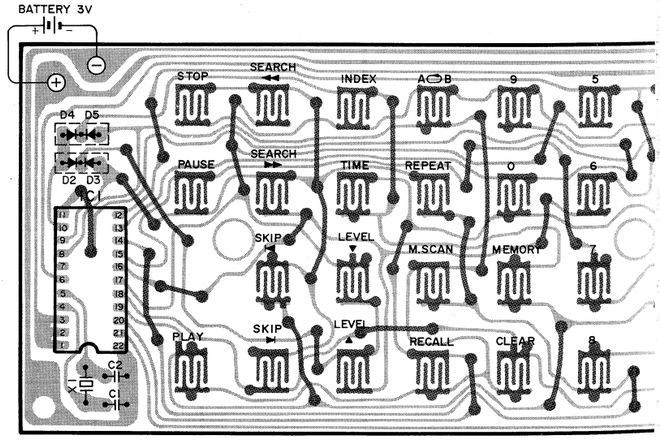
A OPERATION P.C.B.



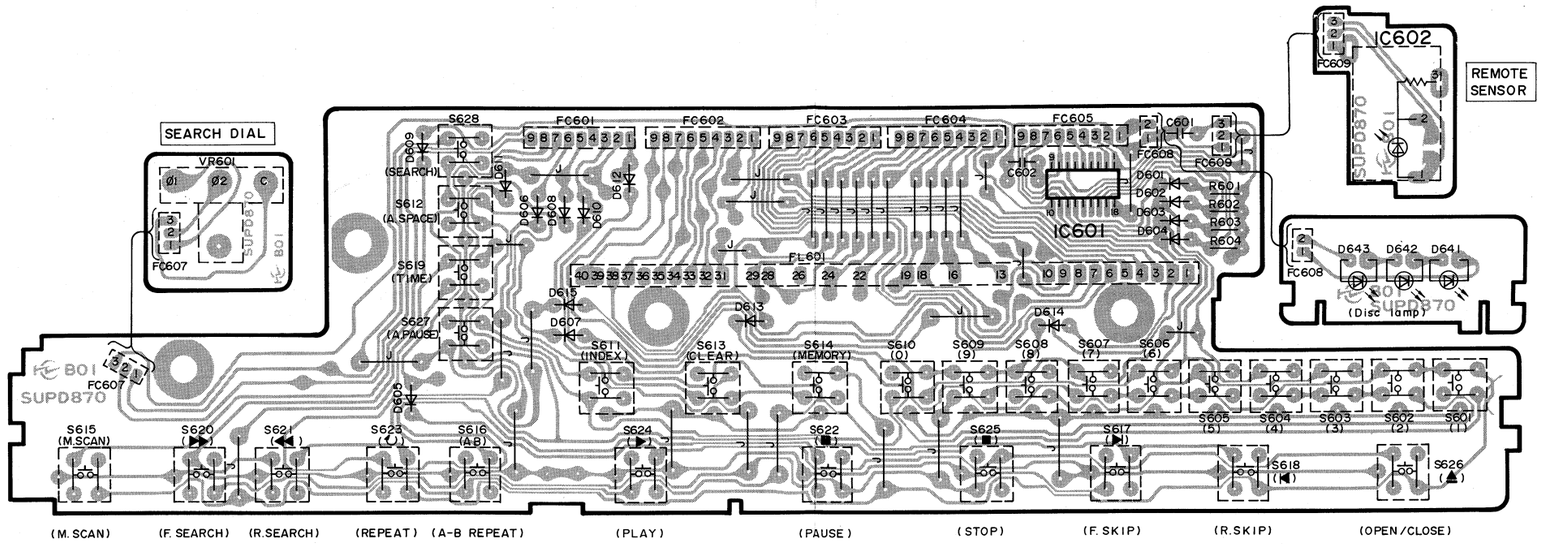
C SPINDLE MOTOR DRIVE P.C.B.



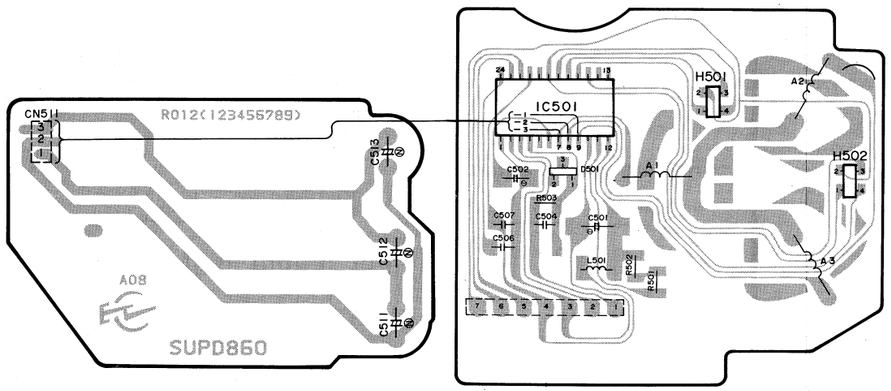
REMOTE CONTROL P.C.B.



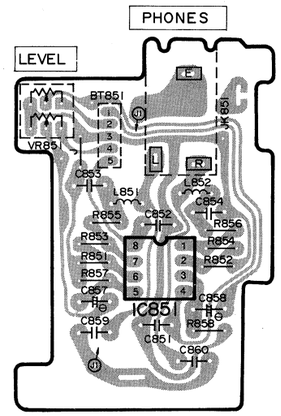
A OPERATION P.C.B.



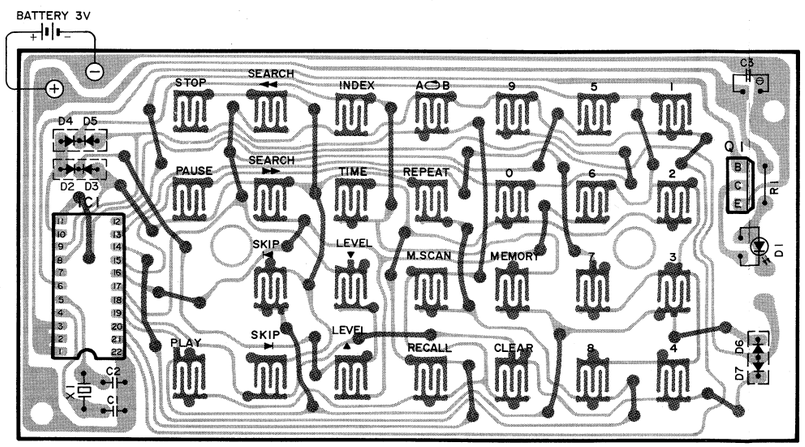
C SPINDLE MOTOR DRIVE P.C.B.



D HEADPHONES AMP P.C.B.



REMOTE CONTROL P.C.B.



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

1. **S1** : Power switch in "**on**" position.
2. **S2** : Voltage selector switch. (For [EK], [XA], [XB], [PA], [PE] and [PC] areas.)
3. **S101** : Disc holder open/close detection switch.
4. **S601~610** : Numeric switch.
5. **S611** : Index switch.
6. **S612** : Auto space switch.
7. **S613** : Clear switch.
8. **S614** : Memory switch.
9. **S615** : Music scan switch.
10. **S616** : A-B repeat switch.
11. **S617** : Forward skip switch.
12. **S618** : Backward skip switch.
13. **S619** : Time mode switch.
14. **S620** : Forward search switch.
15. **S621** : Backward search switch.
16. **S622** : Pause switch.
17. **S623** : Repeat switch.
18. **S624** : Play switch.
19. **S625** : Stop switch.
20. **S626** : Open/close switch.
21. **S627** : Auto pause switch.
22. **S628** : Search dial on/off switch.
23. The voltage value and waveform are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis.
    Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
    * The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.
24. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
25. ———: Positive voltage lines and negative voltage lines.
    ▒▒▒: Audio signal lines.

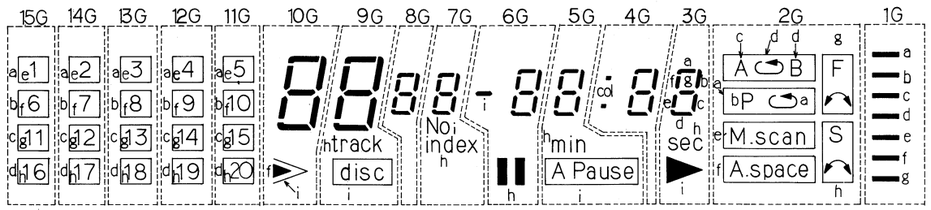
* Caution!

IC and LSI are aensitive to static electricity. Secondary trouble can be prevented by taking care during repair.

* Cover the parts boxes made of plastics with aluminum foil.
* Ground the soldering iron.
* Put a conductive mat on the work table.
* Do not touch the legs of IC or LSI with the fingers directly.

■ INTERNAL CONNECTIONS OF FL

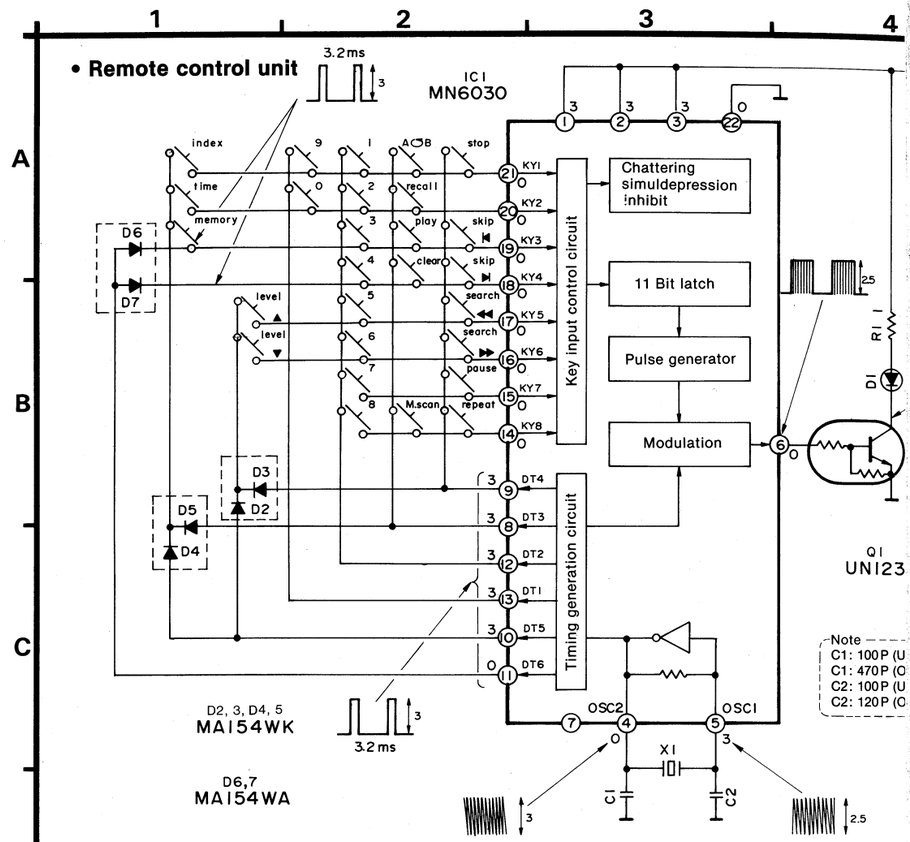
• Grid connection diagram



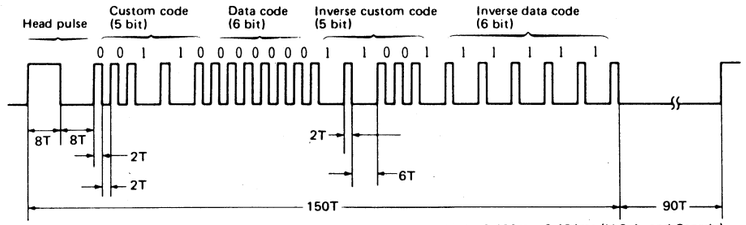
• Anode connection table

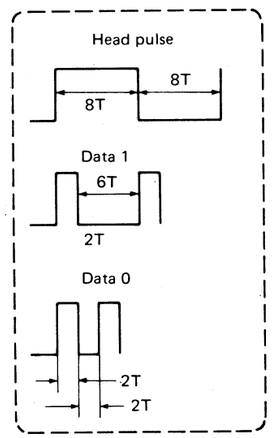
	15G	14G	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	□1	□2	□3	□4	□5	a	a	a	a	a	a	a	a	↻	0dB
b	□6	□7	□8	□9	□10	b	b	b	b	b	b	b	b	P	2dB
c	□11	□12	□13	□14	□15	c	c	c	c	c	c	c	c	A↻	4dB
d	□16	□17	□18	□19	□20	d	d	d	d	d	d	d	d	B	6dB
e	1	2	3	4	5	e	e	e	e	e	e	e	e	M.scan	8dB
f	6	7	8	9	10	f	f	f	f	f	f	f	f	A.space	10dB
g	11	12	13	14	15	g	g	g	g	g	g	g	g	F	12dB
h	16	17	18	19	20	▶	track	-	index	❚❚	min	col	sec	S	-
i	-	-	-	-	-	>	disc	-	No.	—	A Pause	-	▶	-	-

• Remote control unit



• Remote control data code

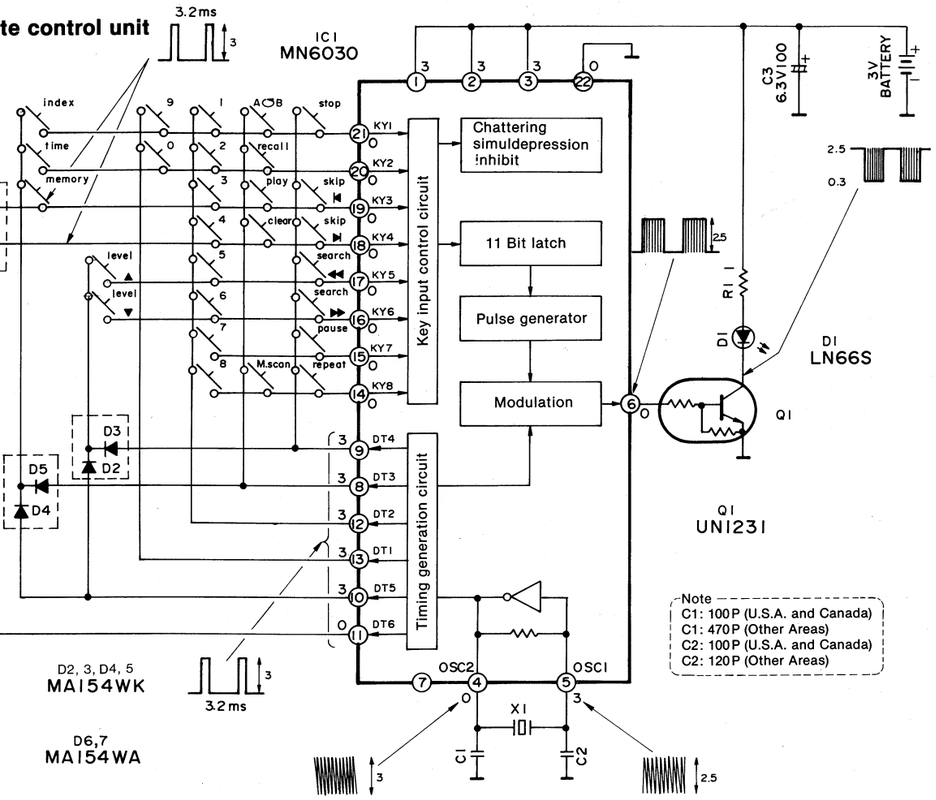




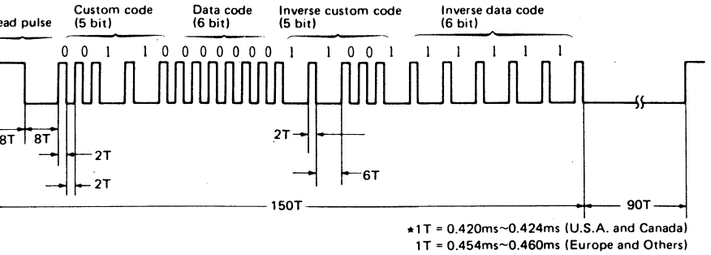
Button	Data Code
1	0 0 0 0 0 1 0
2	1 0 0 0 0 1 0
3	0 1 0 0 0 1 0
4	1 1 0 0 0 1 0
5	0 0 1 0 0 1 0
6	1 0 1 0 0 1 0
7	0 1 1 0 0 1 0
8	1 1 1 0 0 1 0
9	0 0 0 1 0 1 0
0	1 0 0 1 0 1 0
memory	0 1 0 1 0 0 1
index	0 0 0 1 0 1
time	1 0 0 1 0 1
stop	0 0 0 0 0 0

Button
clear
A-B repeat
repeat
M scan
recall
◀◀ search
search ▶▶
⏮ skip
skip ⏭
❚❚ pause
play ▶
▼ level
level ▲

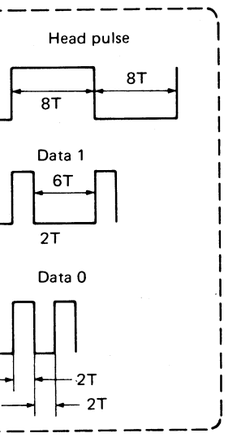
te control unit



te control data code

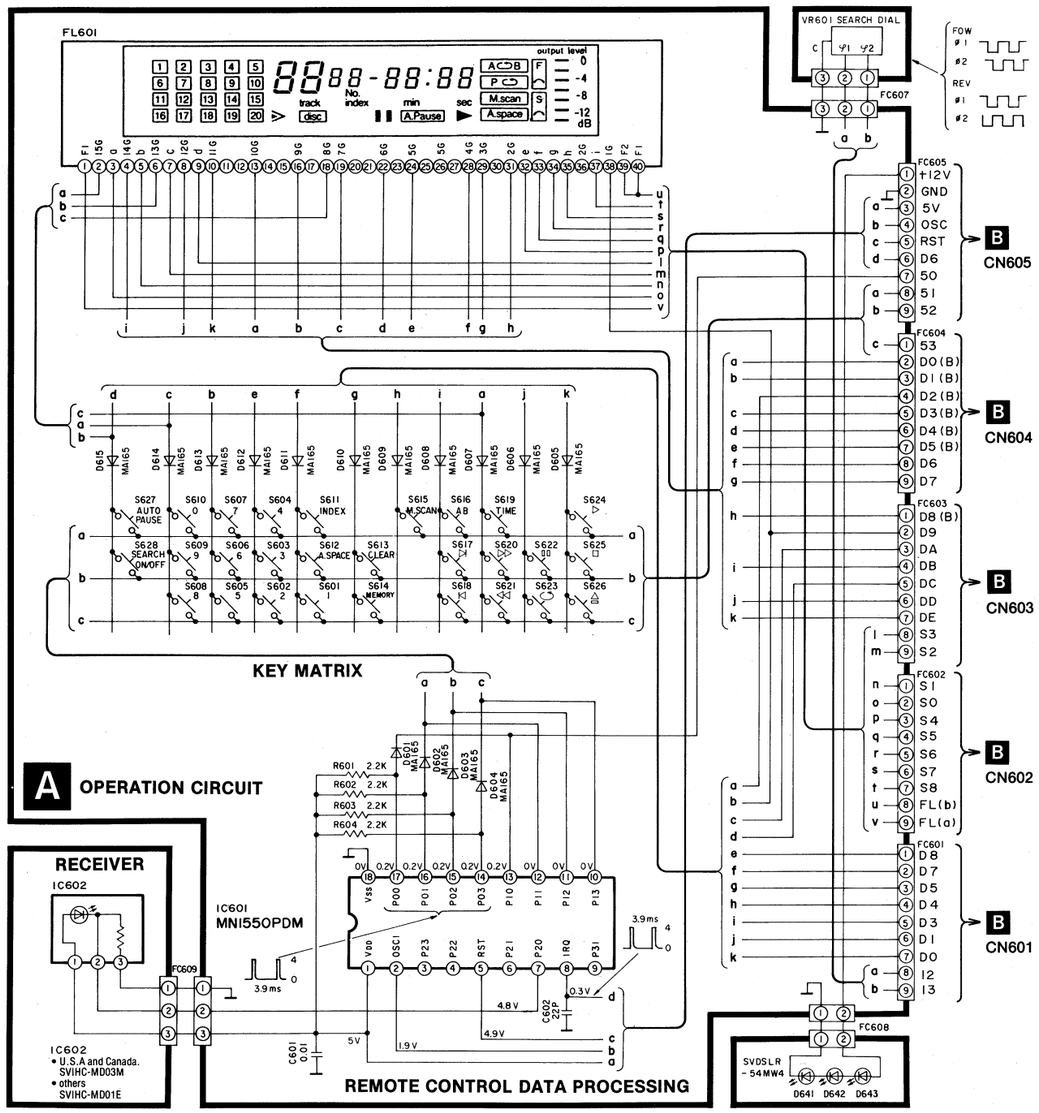


*1T = 0.420ms~0.424ms (U.S.A. and Canada)
1T = 0.454ms~0.460ms (Europe and Others)

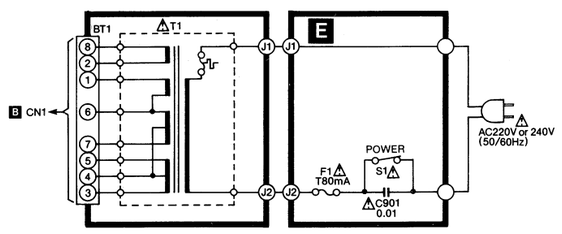


Button	Data Code
1	0 0 0 0 1 0
2	1 0 0 0 1 0
3	0 1 0 0 1 0
4	1 1 0 0 1 0
5	0 0 1 0 1 0
6	1 0 1 0 1 0
7	0 1 1 0 1 0
8	1 1 1 0 1 0
9	0 0 0 1 1 0
0	1 0 0 1 1 0
memory	0 1 0 1 0 1
index	0 0 0 1 0 1
time	1 0 0 1 0 1
stop	0 0 0 0 0 0

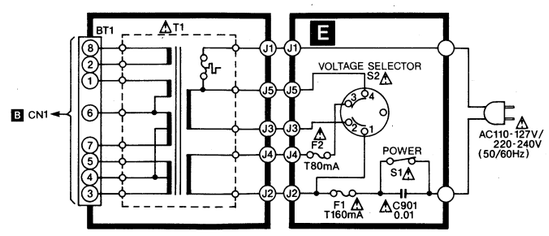
Button	Data Code
clear	1 1 0 1 0 0
A-B repeat	0 0 0 1 0 0
repeat	1 1 1 0 0 0
M scan	1 1 1 1 0 0
recall	1 0 0 1 0 0
◀◀ search	0 0 1 0 0 0
search ▶▶	1 0 1 0 0 0
▮◀ skip	0 1 0 0 0 0
skip ▶▮	1 1 0 0 0 0
▮▮ pause	0 1 1 0 0 0
play ▶	0 1 0 1 0 0
▼ level	1 0 1 0 0 1
level ▲	0 0 1 0 0 1



• Power supply circuit (For Continental Europe and Australia)



• Power supply circuit (For others)



LOADING MOTOR

IC403
SVIBA6218

IC106
BU4053B or MN4053B

OPTICAL PICKUP

SPEED/POSITION SENSOR

LOADING MOTOR DRIVE

OPEN/CLOSE DET.

FL DRIVE

SYSTEM CONTROL

RESET SIGNAL GENERATOR

FOCUS, TRACKING and SERVO

OPTICAL SERVO

SPINDLE MOTOR DRIVE

IC401
MN15283PDP

IC101
SVIM5228Por
AN6554

IC103
SVIM5228Por
AN6554

IC402
SVIM51953BL

IC501
AN8290S

Q101,103,105
2SDI227M or
2SD973

Q102,104,106
2SB91IM or
2SB793

Q105 Q106 Q103 Q104 Q107 Q108 Q109 Q110 Q111

Q416 Q415 Q413 Q412 Q411 Q409 Q408

Q408,409,411~413
415,416
DTC124ESTor
UN4212

Tracking offset adj.

Focus gain adj.

Focus offset adj.

Best eye adj.

Pickup OUT IN

FC605 FC604 FC603 FC602 FC601

SEACH DIAL

A B C MAIN CIRCUIT

OPTICAL PICKUP

FOCUS, TRACKING and SERVO

OPTICAL SERVO

SPINDLE MOTOR DRIVE

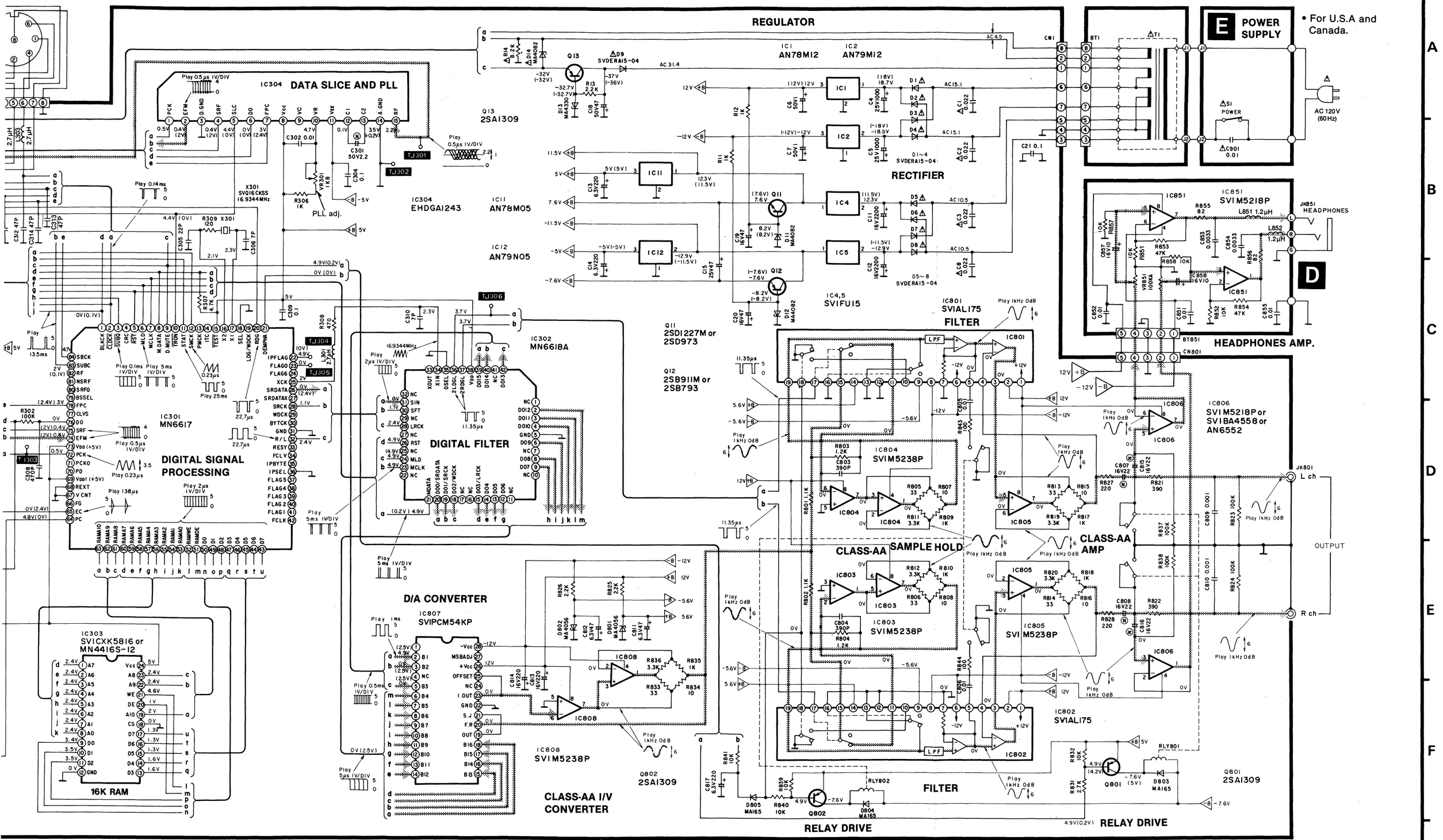
DIGITAL SIGNAL PROCESSING

DIGITAL FILTER

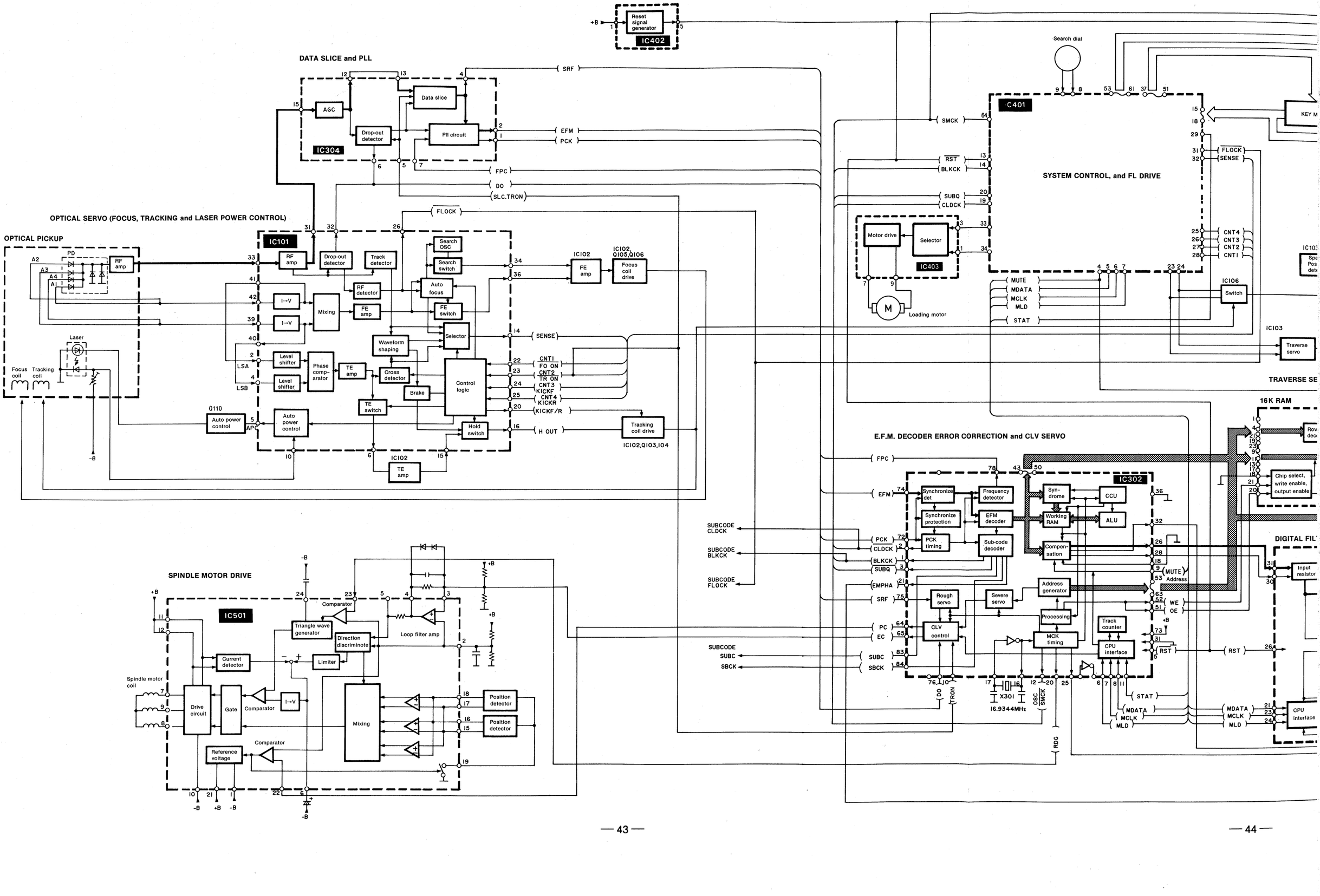
D/A CONVERTER

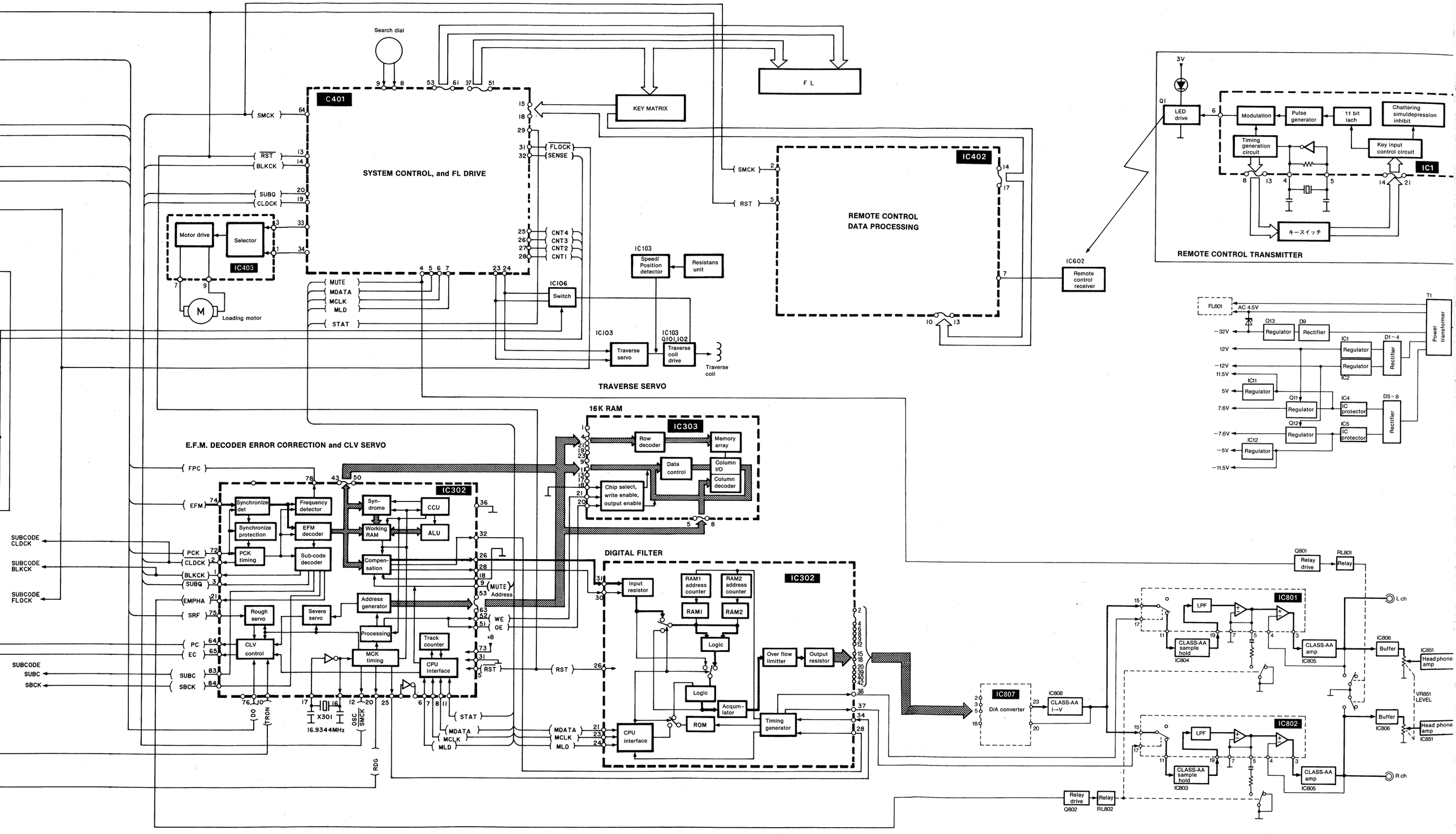
CLASS-AA I/V CONVERTER

REGULATOR

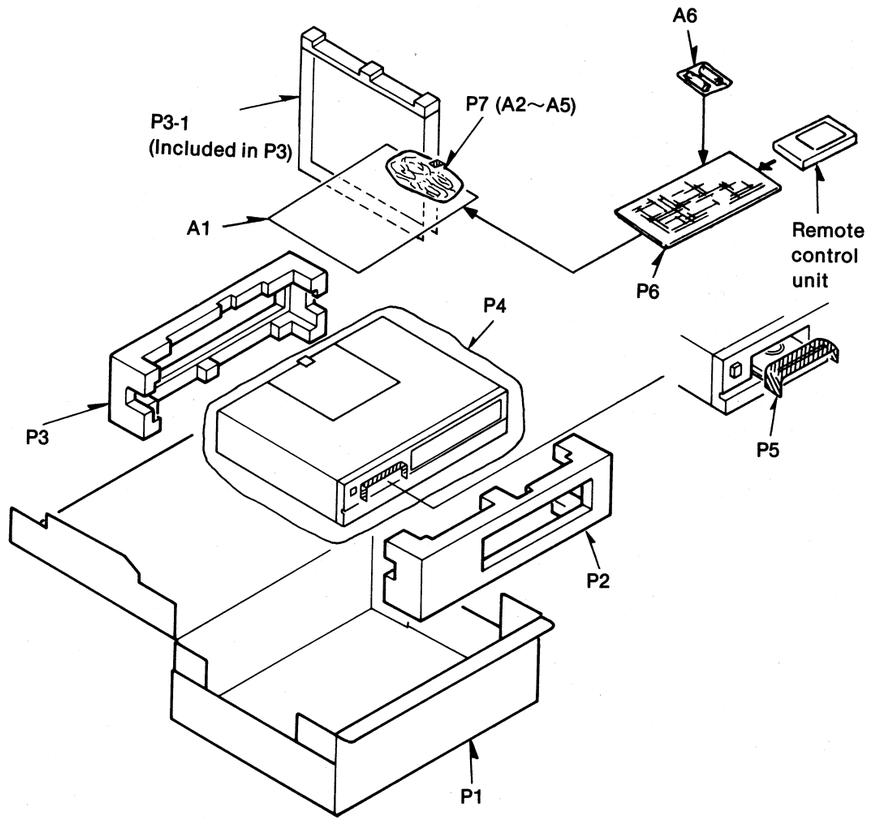

REGULATOR
IC1 AN78M12
IC2 AN79M12
RECTIFIER
D1~4 SVDERA15-04
D5~8 SVDERA15-04
IC4,5 SVIFU15
Q11 2SD1227M or 2SD973
Q12 2SB911M or 2SB793
Q13 2SA1309
IC11 AN78M05
IC12 AN79N05
E POWER SUPPLY
• For U.S.A and Canada.
AC 120V (60Hz)
D HEADPHONES AMP.
IC851 SVIM5218P
JK851 HEADPHONES
IC304 DATA SLICE AND PLL
IC304 EHDGAI243
X301 SVQ16CKSS 16.9344MHz
PLL adj.
IC302 MN6618A
IC301 MN6617
DIGITAL SIGNAL PROCESSING
DIGITAL FILTER
IC303 SVICXK5816 or MN4416S-12
16K RAM
D/A CONVERTER
IC807 SVIPCM54KP
IC808 SVIM5238P
CLASS-AA I/V CONVERTER
IC801 SVIAL175
FILTER
IC804 SVIM5238P
IC805 SVIM5238P
CLASS-AA SAMPLE HOLD
IC806 SVIM5218P or SVIBA4558 or AN6552
CLASS-AA AMP
IC802 SVIAL175
FILTER
Q801 2SA1309
Q802 2SA1309
RELAY DRIVE
RELAY DRIVE
JK801 L ch
R ch
OUTPUT

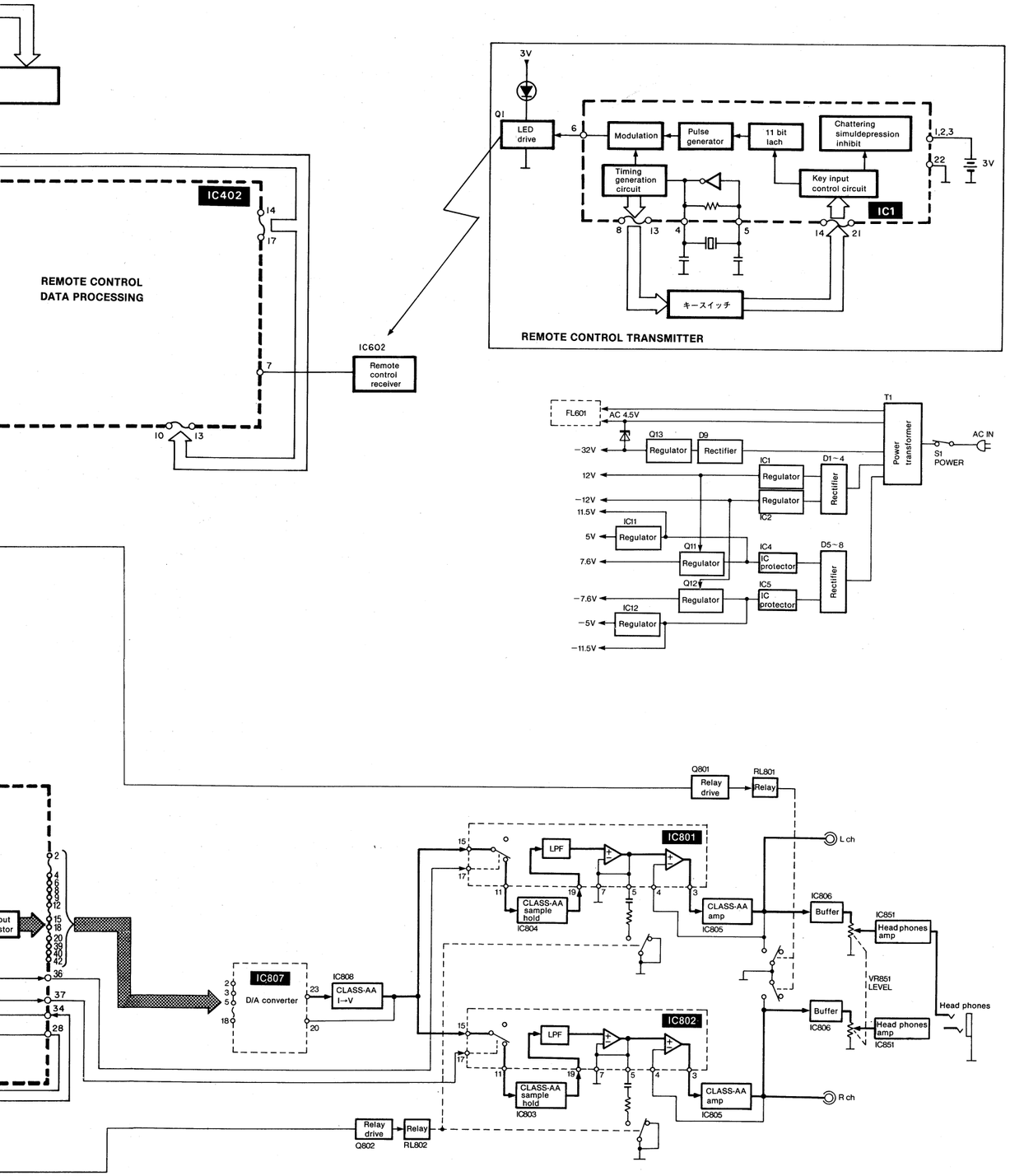
■ BLOCK DIAGRAM




Search dial
IC401
SYSTEM CONTROL, and FL DRIVE
SMCK
RST
BLKCK
SUBQ
CLDCK
Motor drive
Selector
IC403
Loading motor
MUTE
MDATA
MCLK
MLD
STAT
FLOCK
SENSE
CNT4
CNT3
CNT2
CNT1
KEY MATRIX
F L
IC402
REMOTE CONTROL
DATA PROCESSING
IC602
Remote control receiver
IC106
Switch
IC103
Speed/ Position detector
Resistans unit
IC103
Traverse servo
IC103 Q101,102
Traverse coil drive
Traverse coil
TRAVERSE SERVO
16K RAM
IC303
Row decoder
Memory array
Data control
Column I/O
Column decoder
Chip select, write enable, output enable
E.F.M. DECODER ERROR CORRECTION and CLV SERVO
IC302
FPC
EFM
Synchronize det
Frequency detector
Synchronize protection
EFM decoder
PCK timing
Sub-code decoder
Syn-drome
CCU
Working RAM
ALU
Compen-sation
Address generator
Processing
Track counter
CPU interface
Rough servo
Severe servo
CLV control
MCK timing
PCK
CLDCK
BLKCK
SUBQ
EMPHA
SRF
PC
EC
SUBC
SBCK
X301
16.9344MHz
OSC
SMCK
RDG
TRON
WE
OE
Address
DIGITAL FILTER
Input resistor
RAM1 address counter
RAM2 address counter
RAM1
RAM2
Logic
Logic
Acqum-lator
ROM
Over flow limitter
Output resistor
Timing generator
CPU interface
IC807
D/A converter
IC808
CLASS-AA I→V
REMOTE CONTROL TRANSMITTER
3V
Q1
LED drive
Modulation
Pulse generator
11 bit lach
Chattering simuldepression inhibit
Timing generation circuit
Key input control circuit
キースイッチ
IC1
FL601
AC 4.5V
Q13
D9
Regulator
Rectifier
T1
Power transformer
−32V
12V
−12V
11.5V
5V
7.6V
−7.6V
−5V
−11.5V
IC11
IC2
IC12
Q11
Q12
IC4
IC5
IC protector
D1−4
D5−8
Q801
Relay drive
RL801
Relay
Q802
RL802
IC801
IC802
LPF
CLASS-AA sample hold
IC804
IC803
CLASS-AA amp
IC805
IC806
Buffer
IC851
Head phone amp
VR851 LEVEL
L ch
R ch

■ PACKING





Printed in Japan
861008000 Ⓗ SM/HS

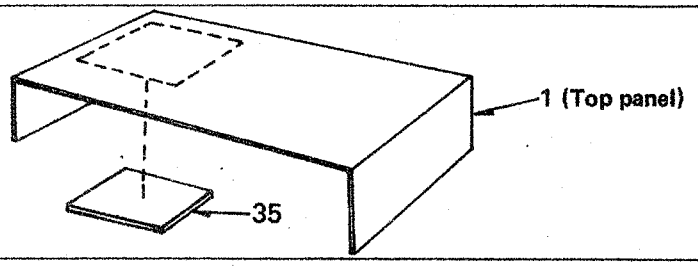
ORDER NO. HAD8703010P0

Parts Change Notice

Model No. SL-P720

Please file this parts change notice with your copy of the Service Manual for model No. SL-P720, Order No. HAD8610737C0.

Please revise the original parts list in the Service Manual to conform to the change (s) shown below. If new part numbers are shown, be sure to use them when ordering parts.

Reason for Change	*The circled item indicates the reason. If no marking, see the Notes in the button column.
1. Improve performance	
2. Change of material or dimension	
3. To meet approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code	**The circled item Indicates the interchangeability. If no marking, see the Notes in the bottom column.	
	Parts / Unit Production	
A	Original → Early; New → Late	Original or new parts may be used in either early or late production units. Use original parts until the supply is exhausted, then stock new parts.
B	Original → Early; New → Late	Original parts may be used in early production units only. New parts may be used in either or late production units. Use original parts where possible, then stock new parts.
C	Original → Early; New → Late	New parts are to be used in both early and late production units. Stock new parts only.
D	Original → Early; New → Late	Original parts must be used in early production units. New parts must be used in late production units only. Stock both original and new parts.
E	Other	

Part Number Information

Model No.	Ref. No.	Original Part No.	New Part No.	Notes(*,**)	Part Name & Description	Q'ty
SL-P720	35	– – – – –	SHGD35	5, C	Cushion rubber	1

Technics

Matsushita Services Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Sales Company, Division of Matsushita Electric of Puerto Rico, Inc.
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D Ceramica Industrial Park
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Matsushita Electric of Canada Limited
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Ontario, L4W 2T3

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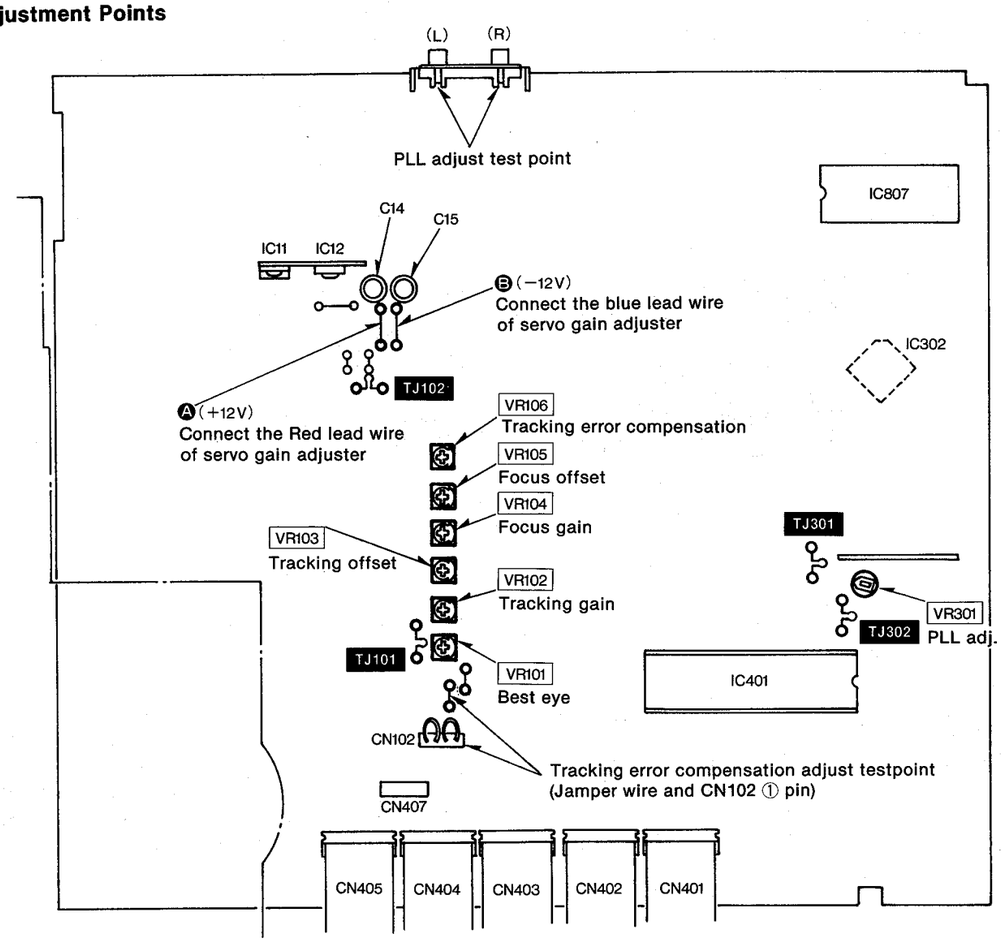
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome,
Minato-ku, Tokyo 105, Japan

Printed in Japan
870300320 ® AM

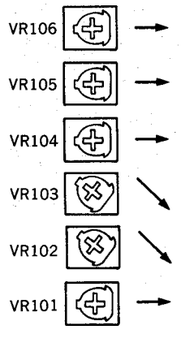
Adjustment Manual

■ MEASUREMENTS AND ADJUSTMENTS

• **Adjustment Points**



• **Temporary Setting of Each VR**



ELECTRICAL ADJUSTMENT

Caution:
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.) With the unit turned "on", laser radiation is emitted from the pickup lens. Be careful during adjustments in particular.

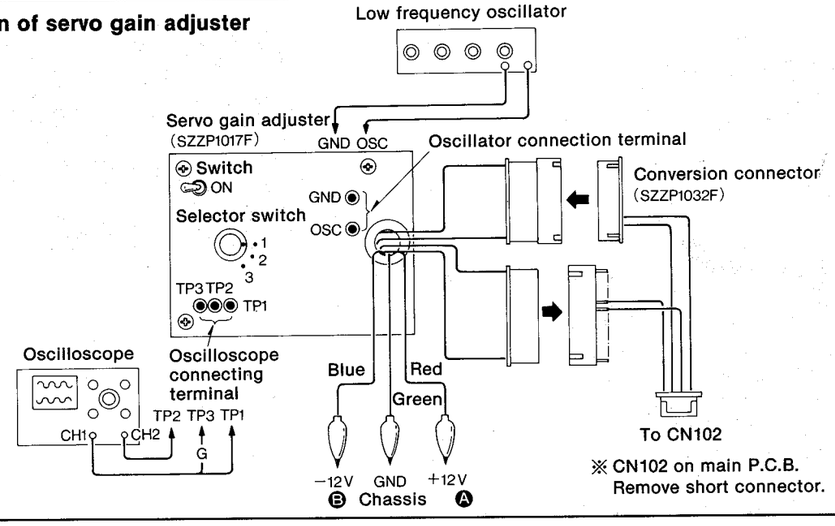
Measuring Instruments and Special Tools

- Servo gain adjuster (SZZP1017F)
- Test disc
  Test disc (SZZP1014F) old and new type
  Inspection test disc (SZZP1054C)
  Unever disc (SZZP1056C)
  Black band disc (SZZP1057C)
- Ordinary disc
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Low frequency oscillator
- Conversion connector (SZZP1032F)

Adjustment procedure

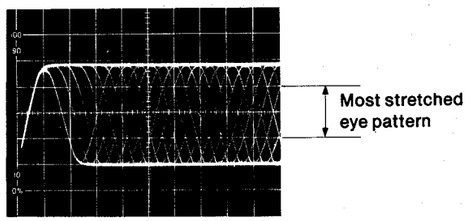
Step 1:	Remove the cabinet.	
Step 2:	Connect the servo gain adjuster.	..... 2 page
Step 3:	Make the temporary setting of each VR.	..... 1 page
Step 4:	Best eye (PD balance) adjustment.	..... 3 page
Step 5:	Focus gain adjustment.	..... 3 page
Step 6:	Tracking gain adjustment.	..... 3 page
Step 7:	Make the temporary adjustment of focus, tracking offset.	..... 4 page
Step 8:	Focus offset adjustment.	..... 4 page
Step 9:	Tracking offset adjustment.	..... 5 page
Step 10:	Tracking error compensation adjustment.	..... 5 page
Step 11:	PLL adjustment.	..... 5 page
Step 12:	Check of operation after adjustment.	..... 6 page

Connection of servo gain adjuster



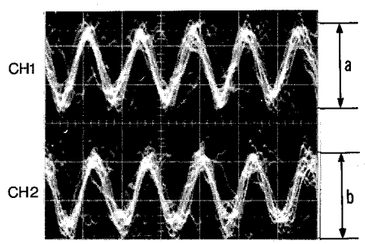
BEST EYE (PD BALANCE) ADJUSTMENT

1. Connect CH1 of the oscilloscope to TJ301 (+) and TJ302 (−) of the main P.C.B.
   Oscilloscope setting: VOLT 500mV
   SWEEP.....0.5µsec.
   INPUT.....AC
2. Turn the power switch "**ON**", then playback the test disc (**SZZP1014F or SZZP1054C**).
3. Adjust **VR101** so that the eye pattern of RF signal is stretched to maximum.



FOCUS GAIN ADJUSTMENT

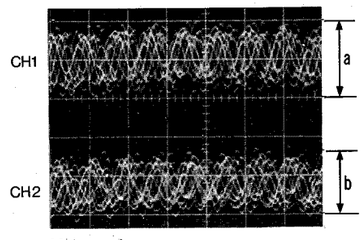
1. Set the low frequency oscillator to **750Hz** and an output voltage **150mVp-p**, then connect the oscillator to the terminals **OSC** and **GND** of the servo gain adjuster.
2. Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.
   (**TP3** is the grounding terminal.)
   Oscilloscope setting: VOLT 100mV
   (both channels)
   SWEEP.....1msec.
   INPUT.....DC
3. Set the servo gain adjuster switch to "**2**".
   (ON/OFF switch to "**ON**")
4. Turn the power switch "**ON**", then playback the test disc (**SZZP1014F or SZZP1054C**)
5. With the servo gain adjuster switch set to "**1**", **750Hz** signal is given in the oscilloscope. Then adjust **VR104** so that the waveforms of **both channels** become equal to each other.



Make a=b

TRACKING GAIN ADJUSTMENT

1. Set the low frequency oscillator to **1.2kHz** and an output voltage **150mVp-p**, then connect the oscillator to the terminals **OSC** and **GND** of the servo gain adjuster.
2. Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.
   (**TP3** is the grounding terminal.)
   Oscilloscope setting: VOLT 100mV
   (both channels)
   SWEEP.....1msec.
   INPUT.....DC
3. Set the servo gain adjuster switch to "**2**".
   (ON/OFF switch to "**ON**")
4. Turn the power switch "**ON**", then playback the test disc (**SZZP1014F or SZZP1054C**)
5. With the servo gain adjuster switch set to "**3**", **1.2kHz** signal is given in the oscilloscope. Then adjust **VR102** so that the waveform of **both channels** become equal to each other.
6. The servo gain adjuster is not necessary for other adjustment. So, remove the connection and attach the short connector to CN102.



Make a=b

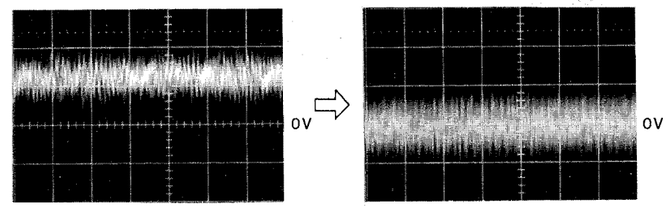
FOCUS, TRACKING • OFFSET TEMPORARY ADJUSTMENT

(FOCUS OFFSET TEMPORARY ADJUSTMENT)

1. Connect **CH1** of oscilloscope to TJ102 (+) and **chassis** (−).
   Oscilloscope setting: VOLT 100mV
   SWEEP.....5msec.
   INPUT.....DC
2. Turn the power switch "**ON**", then playback the test disc (**SZZP1057C**).
3. After reading TOC, set the mode to **STOP**.
4. Adjust **VR105** so that DC level on the oscilloscope becomes **ground level (0V)**.

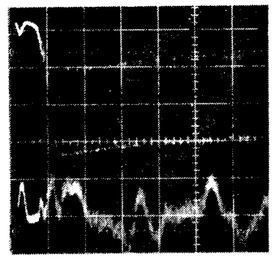
(TRACKING OFFSET TEMPORARY ADJUSTMENT)

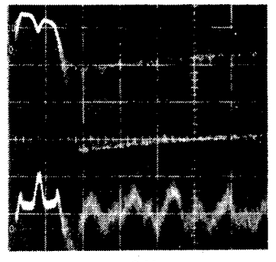
1. Connect **CH1** of oscilloscope to TJ101 (+) and **chassis** (−).
   Oscilloscope setting: VOLT 100mV
   SWEEP.....5msec.
   INPUT.....DC
2. Turn the power switch "**ON**", then playback the test disc (**SZZP1057C**).
3. After reading TOC, set the mode to **STOP**.
4. Adjust **VR105** so that DC level on the oscilloscope becomes **ground level (0V)**.

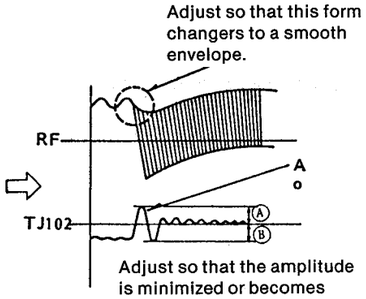


FOCUS OFFSET ADJUSTMENT

1. Connect CH1 of the oscilloscope to the TJ301 (+) and TJ302 (−). Connect CH2 to the TJ102 (+) and TJ302 (−) of the main P.C.B.
   Oscilloscope setting: VOLT 500mV (CH1)
   100mV (CH2)
   SWEEP.....0.5msec.
   INPUT.....AC (CH1)
   DC (CH2)
   MODE.....NORM
   (Triggering via CH1)
2. Turn the power switch "**ON**", and playback **track 9** (black band) of test disc (**SZZP1057C**).
3. Trigger so that waveforms appear on the oscilloscope, and adjust VR105 so that the depression of RF of CH1 Changes to a smooth envelope and that the waveform amplitude of CH2 is minimized or becomes equal between Ⓐ and Ⓑ.

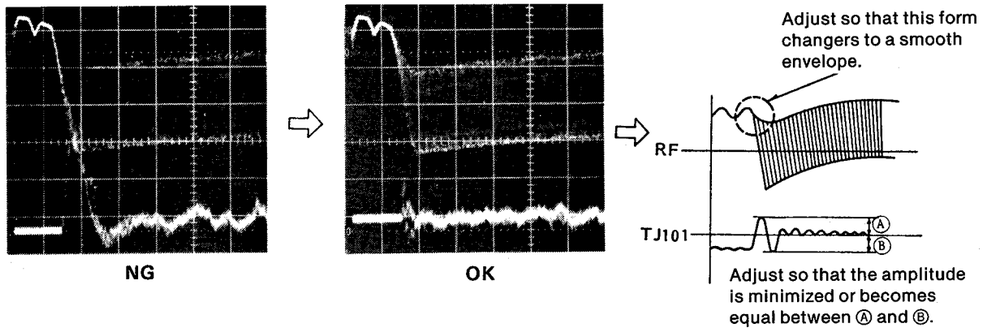

NG


OK



TRACKING OFFSET ADJUSTMENT

1. Connect CH1 of the oscilloscope to the **TJ301** (+) and **TJ302** (−). Connect the CH2 to the **TJ101** (+) and **TJ302** (−) of the main P.C.B.
   Oscilloscope setting: VOLT 500mV (CH1)
   100mV (CH2)
   SWEEP.....0.5msec.
   INPUT.....AC (CH1)
   DC (CH2)
   MODE.....NORM
   (Triggering via CH1)
2. Turn the power switch "**ON**", and playback **track 9** (black band) of test disc (**SZZP1057C**).
3. Trigger so that waveforms appear on the oscilloscope, and adjust VR103 so that the depression of RF of CH1 Changes to a smooth envelope and that the waveform amplitude of CH2 is minimized or becomes equal between Ⓐ and Ⓑ.

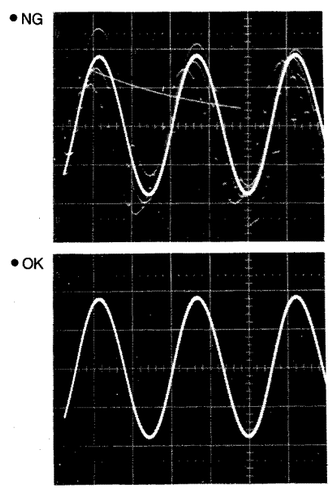


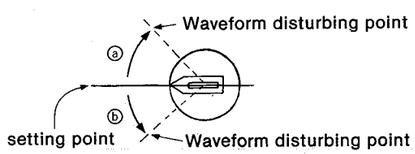
TRACKING ERROR COMPENSATION ADJUSTMENT

1. Connect CH1 of oscilloscope to the test point ⊕ for **tracking error compensation** of main P.C.B. and the **chassis** ⊖.
   Oscilloscope setting: VOLT 50mV
   SWEEP.....1msec.
   INPUT.....DC
2. Turn the power switch "**ON**", and playback **track 1** of test disc (**SZZP1014F or SZZP1054C**).
3. Adjust **VR106** so that the waveform on the oscilloscope is DC level **0±5mV**.

PLL ADJUSTMENT

1. Connect CH1 of oscilloscope to **LINE OUT terminal** (L or R) of main P.C.B. and the chassis (−).
   Oscilloscope setting: VOLT 1V
   SWEEP.....1msec.
   INPUT.....DC
2. Turn the power switch "**ON**" and playback **track 7** of test disc (SZZP1054C).
3. Slowly adjust **VR301** while watching the waveform on the oscilloscope.
   ⓐ Turn VR301 clockwise until the waveform begins to be disturbed, and then remember the position.
   ⓑ Next, turn VR301 counterclockwise and remember the position where the waveform begins to be disturbed.
   ⓒ Set VR301 to the middle of the positions remembered.





CHECK OF PLAY OPERATION AFTER ADJUSTMENT

- **Skip search check**
  1. Play back a common disc.
  2. Press the skip button and check that skip search can be done. (Both forward and reverse)
- **Manual search check**
  1. Play back a common disc.
  2. Press the manual serach button and check that manual search can be smoothly done at low and high speeds. (Both forward and reverse)
- **Check for defect**
  1. Play back the black spot of test disc and check for sound skip or noise.
  2. Play back the finger print of test disc and check for sound skip or noise.

OPTICAL PICK-UP ADJUSTMENT

Measuring Instruments and Special Tools

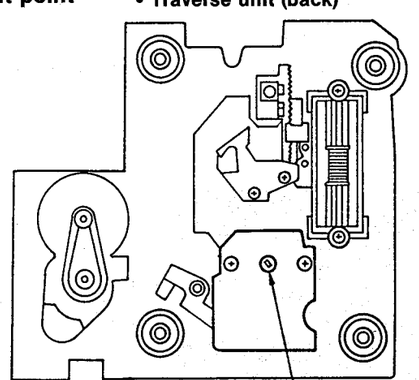
- Two-channel oscilloscope (with EXT trigger) of 30MHz or over
- Test disc (SZZP1014F, SZZP1054C, SZZP1056C)
- Hexagonal wrench (SZZP1044C)

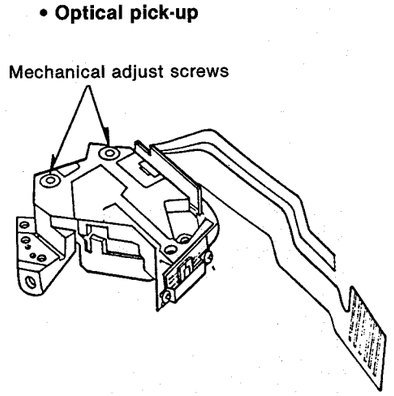
Adjustment Procedure and Adjustment Point

- If the optical pickup is replaced, adjust it according to the following procedure.

Step 1: Assemble the set to get ready for power ON.
↓
Step 2: Make the temporary setting of each VR. ..... 1 page
↓
Step 3: Adjust the hight of turntable. ..... 7 page
↓
Step 4: Adjust the mechanical. ..... 7 page
↓
Step 5: Make the electric adjustment. ..... 2 page

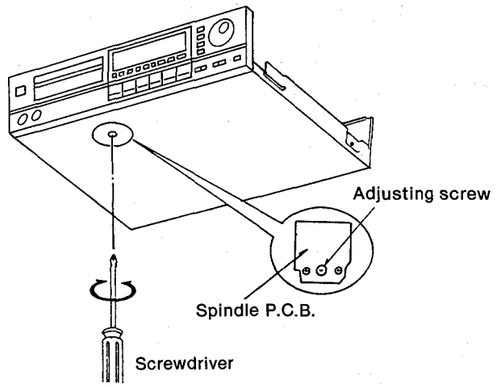
Adjustment point

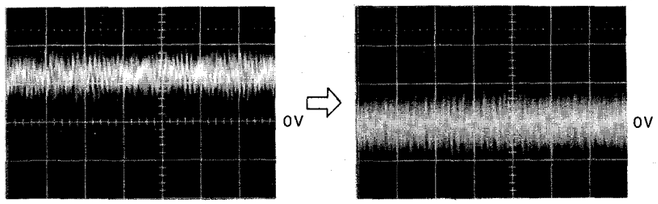




TURNTABLE HEIGHT ADJUSTMENT

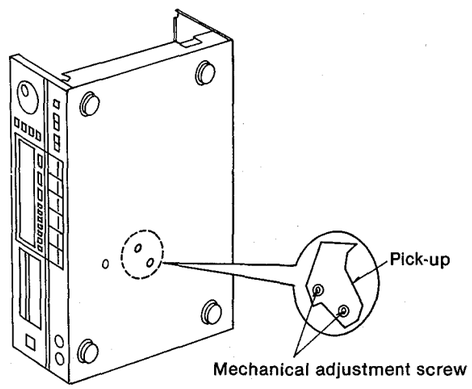
1. Connect CH1 of the oscilloscope to **TJ102** (+) of main P.C.B. and **chassis** (−).
   Oscilloscope setting: VOLT 100mV
   SWEEP.....5msec.
   INPUT.....DC
2. Set the DC zero balance of the oscilloscope.
3. Turn the power switch "**ON**" and play back the test disc (SZZP1014F or SZZP1054C).
4. Turn the **adjusting** screw so that the center of waveform on the oscilloscope is **0±50mV**.
   (Insert a flat head screwdriver from the bottom of the set as shown.)
5. After the adjustment, apply **screw-lock paint** (RZZOL01) to the adjusting screw.

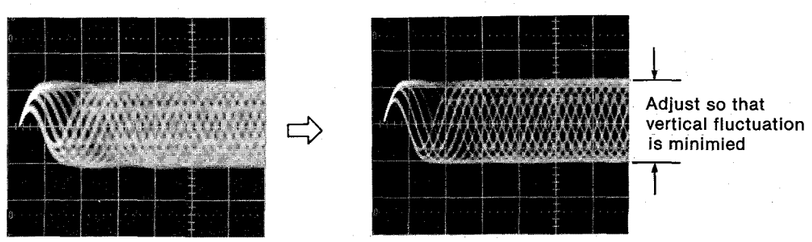




MECHANICAL ADJUSTMENT

1. Connect CH1 of the oscilloscope to **TJ301** (+) and **TJ302** (−) of main P.C.B.
   Oscilloscope setting: VOLT 500mV
   SWEEP.....0.5μsec.
   INPUT.....AC
2. Turn the power switch "**ON**" and play back the **track 9** of test disc (SZZP1056C).
   (If any track other than track 9 is playback, this adjustment cannot be achieved.)
3. Shift the set as shown with it played back. (If the set is reversely shifted, it cannot be completely adjusted.)
4. Alternately turn the Mechanical adjusting screws (2 pcs.) so that the vertical fluctuation of the waveform (RF signal) on the oscilloscope is minimized.
5. After the adjustment, apply **screw-lock paint** (RZZ0L01) to the adjusting screw.





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